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The *Pteris quadriaurita* complex in Ceylon

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In 1791 Retzius described a specimen sent to him from Ceylon by König and gave it the name *Pteris quadriaurita* see p. 324. This name has since been applied somewhat indiscriminately by pteridologists to plants having a similar facies from virtually the entire geographical range of the genus. In more recent times however Hieronymus (1914) recognised that the name was being misapplied and described a number of segregates, but even with the removal of these there still remain many different species included in this compendium term. It is the purpose of this paper to define the Ceylon members of the complex, some of which have already been given specific recognition, and to add specific diagnoses of four new members.

In the winter of 1950–51 Professor I. Manton led an expedition to Ceylon from the Botany Department of the University of Leeds in order to undertake a cytological investigation of the Pteridophyte flora of the island, and the results have been recorded elsewhere (Manton and Sledge, 1954). Both living and herbarium specimens of the genus *Pteris* collected by the expedition were handed over to me for a detailed cytotaxonomic investigation and this material was further supplemented by a visit to Ceylon by Dr. W. A. Sledge and myself in 1954. On examination of this material it was found that some species could be identified without difficulty but a large residue of specimens referable to *Pteris quadriaurita* sensu lato remained which seemed to be almost intractable when studied by classical morphological methods alone. This residue contained many forms which graded from one to another without any obvious discontinuities and, as will be pointed out later, it is now known that extensive hybridization between certain species has contributed to this complicated situation. It was imperative therefore in dealing with the problem to establish reliable criteria for separating the components on experimental grounds, no matter how arduous and time-consuming, and then to see if such criteria once established could be correlated with more or

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less constant morphological features which would then enable one to identify specimens in the herbarium rapidly and accurately. Therefore in addition to the living plants which had been sent from Ceylon a large number of spore sowings was made from the herbarium material and the resultant plants examined cytologically. It was found that the chromosome numbers (x = 29) and the type of breeding behaviour (whether sexual or apogamous) enabled several clear-cut groups to be established but nevertheless a large group remained whose components were all diploid and sexual but which were obviously not morphologically homogeneous, so that additional methods had to be evolved to deal satisfactorily with this group.

As a matter of routine spores from each specimen were mounted in glycerine jelly and examined microscopically and it became apparent that such features as size, shape and sculpturing of the spores could form a basis for subdividing this heterogeneous group. On sowing samples of these spores and raising progeny from them it was found that the juvenile plants so produced had very marked morphological characters which differed conformably with the spore characters; that is to say, all spores of the same size and sculpturing gave rise to juvenile plants which were similar in appearance to each other but which differed from those raised from spores of a different size and sculpturing.

Having thus established grounds for a further division of the sexual diploid group the morphology of the adult fronds was examined and it was found that the divisions recognised were now homogeneous and capable of being treated by classical methods with the exception of the components of a single division. Further experimental analysis has shown that the bewildering range of morphology in this exceptional division has arisen as a result of the frequent hybridization in the wild of two morphologically very dissimilar species—*P. quadriaurita* Retz. sensu stricto and *P. multiaurita* J. G. Agardh. Such hybrids are fully fertile and give rise to vast swarms of segregant and backcross forms which exhibit a complete morphological spectrum from one parent species to the other; these have been considered in detail elsewhere (Walker, 1958).

Although the experimental work has been very time-consuming without it the complex would probably have remained intractable, and a further result is that in the descriptions of new species there has been some shifting of emphasis on the diagnostic value of several characters; thus spore characters, the type and distribution of the spinules on the pinna segments, etc., have been considered to be of great value, whilst scale characters are considered to be of little diagnostic importance in the Ceylon members of the complex as they tend to be uniform and in particular are very liable to be completely lost from herbarium specimens, unlike those of many other fern genera.

Thus species have only been described here as new after careful consideration and if they conform to certain criteria. The sexual species show constant characters from one population to another and present little difficulty once the key characters have been recognised, but in the apogamous species further comment is necessary concerning the effects of an asexual mode of reproduction on the taxonomy of such plants. It suffices to note that in Ceylon the genus *Pteris* does not present the problem so often encountered in Angiosperms among apomictic species of genera such as

Hieracium and *Rubus* where variation in morphology is sometimes so great that the number of 'species' recognised may be in almost direct proportion to the number of populations studied. Thus *P. confusa* T. G. Walker and *P. gongalensis* T. G. Walker from different populations each show constant features of the frond, spores, juvenile stages, etc., by which they may be recognised and in this respect resemble sexual species despite their apogamous nature.

Hybrids occur in the wild in varying degrees of abundance and as these have also been experimentally produced and analysed their true nature has been recognised and hence excluded from formal taxonomic treatment. Hybrids not so far found in the wild have been produced experimentally also and an analysis of these and their bearing on the interrelationships of the various species of the complex should soon be completed and reported upon elsewhere.

In this paper are included citations of some specimens from the Conservatoire et Jardin Botaniques, Geneva, which were seen whilst on loan to the late Mr. A. H. G. Alston at the British Museum (Natural History). The standard abbreviations for herbaria as listed in 'Index Herbariorum' have been used throughout.

KEY TO THE SPECIES.

Pinnae and pinna-lobes (if any) entire . . . . . 1. *multiaurita*
Pinnae and pinna-lobes (if any) not entire:
Pinnae irregularly pinnatifid . . . . . 1a. *multiaurita* × *quadriaurita*
Pinnae regularly pinnatifid:
Pinnae lobed almost to the costa (sinus less than 1·3 mm. from the costa):
Segments with serrate tips . . . . . 2. *quadriaurita*
Segments with entire tips:
Rhizome creeping; pinnae up to 15 pairs; short spinules on costae; long spinules towards the apices of the segments . . . 3. *reptans*
Rhizome erect; pinnae 4–8 pairs; long spinules on costae; long spinules towards the apices of the segments . . . . . 4. *praetermissa*
Rhizome erect; pinnae 4–9 pairs; short spinules on costae; spinules absent or inconspicuous on the segments . . . . . 5. *gongalensis*
Pinnae lobed to not less than 1·5 mm. from the costa:
Pinnae green all over . . . . . 6. *confusa*
Pinnae with a white stripe down the centre . . 7. *argyraea*

1. *Pteris multiaurita* J. G. Agardh, Rec. Sp. Gen. Pteridis 12 (1839)

SYNTYPES: *Macrae* sine numero (E) and *Emerson* sine numero, 1827 (E), both from Ceylon.

At first sight it may seem strange that *P. multiaurita*, a simply-pinnate species, should be here included as a member of the *P. quadriaurita* complex which typically is composed of pinnatifid species, but experimental and field

work have shown that this species not only freely hybridizes in nature with *P. quadriaurita* sens. strict. to give rise to vast hybrid swarms in which such individuals are commoner than either parent, but also that these two species are probably closer to one another genetically than any other two members of the complex (for further details see Walker, 1958). Further comment on the taxonomic implications of these hybrids will be deferred to the discussion on *P. quadriaurita*.

2. *P. quadriaurita* Retzius, Obs. Bot. **6**, 38 (1791)

Holotype: a specimen sent from Ceylon by *König*, in Herb. Retzii, Lund.

A good specimen of this species, determined and annotated by F. Ballard, was collected by Col. Walker in Ceylon in 1831 (No. 27) and is now at Kew. Another specimen, at the British Museum (Natural History), has König's name on the back of the sheet and is misleading as it is not a duplicate of the type specimen but is in fact one of the common segregant forms of the hybrid *P. quadriaurita* × *P. multiaurita*. Fig. 1, 1a.

Fig. 1. Silhouette of a frond of *P. quadriaurita* sensu stricto, × 1/6; Fig. 1a. Upper surface of pinna of *P. quadriaurita*, × 2.

In view of the fact that the name *P. quadriaurita* has been so frequently misapplied in the literature some comments as to the characteristics of this species together with an illustration may not be out of place. *P. quadriaurita* sens. strict. typically has serrated tips to its pinna-segments and long prominent spinules are present on the costa and also irregularly along the whole length of the main nerve of the segments. The texture of the frond is less coriaceous than that of the other Ceylon members of the complex. The spores are light brown or honey-coloured (Plate 5, fig. I) about 30μ in diameter, and lack the intermixture of misshapen, abortive spores so characteristic of some, but not all, members of the complex. The spores are furnished with

more or less conspicuous tubercles. All living specimens of this species which I have cytologically examined have proved to be diploid and sexual (n = 29, 2n = 58)—see Plate 5, fig. C.

In his description of this species Retzius states '. . . . . infima duo pinnarum paria bifida vel duplicata, cetera similia'. It should be emphasised that this is not a constant feature and indeed fronds may arise from the same rootstock having variable numbers of pinnae bifid or only the lower pair so.

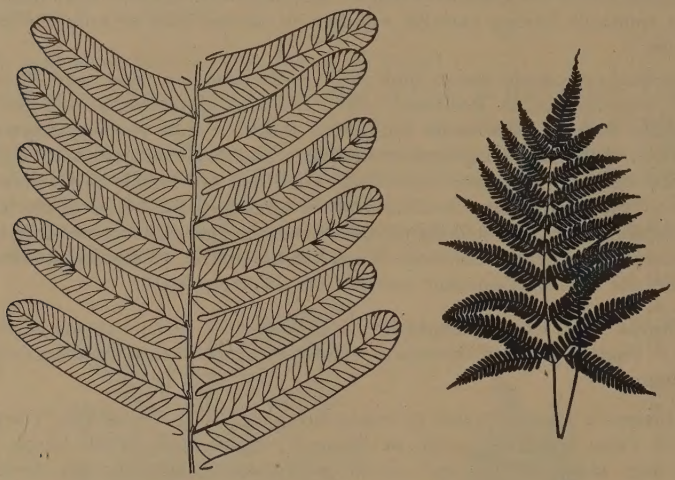
Varietal or specific names such as *P. quadriaurita* var. *ludens* and *P. otaria* have been applied by Beddome (1863, 1883) to specimens having general affinities with *P. quadriaurita* but which differ in that varying degrees of abortion of the pinna-segments are evident, and he illustrated some of these specimens. Such forms are exceedingly abundant in the field in Ceylon and are represented by many specimens in the large national herbaria but it has been shown that these striking plants are merely segregants formed following extensive hybridization between *P. quadriaurita* and *P. multiaurita* and do not qualify for formal taxonomic recognition (Walker, 1958).

3. **Pteris** (sect. **Pteris**) **reptans** *T. G. Walker*, sp. nov.; e turma et affinitate *P. quadriauritae*, sed rhizomate repente et segmentarum apicibus integris distinguitur.

Rhizomate longe repente, in exemplo typica (*T. G. Walker* No. T607) c. 20 cm. longa, 3 cm. lata, 2 cm. in diametro; stipitibus 26–97 cm. longis, basi 2–5 mm. latis, laevibus vel minute tuberculatis unde squamis deciduis, stramineis; rachidibus stramineis vel castaneis; laminis aliquantulum palide viridis, late ovatis vel ovato-lanceolatis, textura herbacea vel subcartilaginea, 21–60 cm. longis, 16–35 cm. latis; pinnis usque ad 15-jugis; pinnis terminalibus similibus sed paullo longioribus quam pinnae superiores; pinnis infimis unifurcatis; pulvinus ubi rachides laterales et rachides principales conjuncti sunt, tuberculis vel squamulis minutis indutis; pinnis lateralibus 10–20 cm. longis, 2–5 cm. latis, pinnatisectis; pinnarum segmentis 15–35 jugis, usque ad 2 mm. inter se distantibus, oblongis aut subfalcato-oblongis, 1·5–2·5 cm. longis, 3·5–6 mm. latis, apicibus integris; sinubus usque ad rachidem attingentibus; venis liberis, 10–15 jugis, venarum apicibus plus-minusve prominentibus; pinnis segmentibusque inflexis; rachidibus lateralibus spinules breves basi costae ferentibus, segmentis apicem versus spinulas longas prominentes ferentibus; soris marginalis, nec ad basin, nec apicem attingentibus; indusiis papyraceis, fuscescentibus, integris, c. 0·5 mm. latis, sporangiis laevibus, c. 18 cellulis incrassatis in annulo dispositis; sporis tetrahedro-globosis, 35–40μ latis, obscure fuscis, rugosis; chromosomatibus gametophyticis 29; chromosomatibus sporophyticis 58; reproductione sexuale. Fig. 2, 2a Plate 5, fig. D.

Ceylon: terrestris in silvis, Haputale Reserve, *T. G. Walker* T607 (BM, holotypus). Ceylon: Woods, Nuwara Eliya, Sept. 1844, *Gardner* 1129 (CGE); Nuwara Eliya, 1950 m., Feb. 24–27, 1954, *F. Schmidt* 1346 (G); in shade on stream bank below Nuwara Eliya, Feb. 20, 1954, *T. G. Walker* T501 (BM); Nuwara Eliya, *Rev. E. V. Freeman* 97D, 98E (BM); on ground in wet jungle, gully near Bot. Garden, Hakgala, alt. 1,674 m., Dec. 30, 1950, *F. Ballard* 1337 (K); common along edge of jungle path, alt. c. 1,800 m., Hakgala

Peak, Dec. 16, 1950, *F. Ballard* 1129 (K); Hakgala Heights, Dec. 1950, *W. A. Sledge*; on other side of stream from road, edge of path in open ground, Hakgala Road towards Nuwara Eliya from the Gardens, alt. c. 1,680 m., Dec. 23, 1950, *F. Ballard* 1211 (K); on banks along path, c. 2,130 m., Mt. Pedro, Nuwara Eliya, Dec. 26, 1950, *F. Ballard* 1252 (K); Horton Plains,



2a 2

FIG. 2. Silhouette of a frond of *P. reptans*, × 1/6; FIG 2a. Upper surface of pinna of *P. reptans*, × 2.

2,270 m., March 7–8, 1954, *F. Schmidt* 1384, 1385, 1398 (G); Kandapola Forest Reserve, March 19, 1954, *W. A. Sledge* 1351 (BM); on path through forest, Kandapola Forest Reserve, March 19, 1954, *T. G. Walker* T855, T856, T857 (BM); on ground in forest, Haputale Reserve, Feb. 25, 1954, *T. G. Walker* T600–T610 (BM, holotype T607, BM); on steep bank by side of path, Ramboda Pass, March 17, 1954, *T. G. Walker* T825, T843, T844 (BM); Badulla, *Rev. E. V. Freeman* s.n. (BM); *G. Wall* s.n. only one of the specimens on the sheet (E); *Gardner* 1129 (BM).

This species is endemic to Ceylon and is very localised within the Island, being confined to the highlands in and around Nuwara Eliya. Where present it grows in abundance.

P. reptans may be distinguished from the other species of *Pteris* in Ceylon by the following combination of characters:—

(1) the creeping rhizome
(2) the presence of tubercles or small scales in the pulvinus
(3) the marked inflexing of the pinnae and segments
(4) the sinus extending almost to the costa
(5) the presence of short spinules on the costa and long, thin spinules on the distal half of the segments
(6) the spore characters (Plate 5, fig. H).

4. **Pteris** (sect. **Pteris**) **praetermissa** *T. G. Walker*, sp. nov.; e turma et affinitate *P. quadriauritae* sed segmentorum apicibus integris distincta.

Rhizomate breve, erecto; stipitibus 20–50 cm. longis, 2–3 mm. basi latis, laevibus, stramineis vel purpurascentibus, basin versus castaneis vel purpurascentibus; rachidibus stramineis, castaneis vel purpurascentibus; laminis obscure viridis, siccitate frequenter atro-viridis, late ovatis, 17–40 cm. longis, 14–28 cm. latis, textura firmiter herbacea: pinnis lateralibus 4–8 jugis, pinnis terminalibus ad pinna superiores similibus, sed longioribus; pinnis infimis unifurcatis; pinnis lateralibus 8·5–16 cm. longis, 2–3·5 cm. latis, pinnatisectis; pinnarum segmentis 14–25 jugis, segmentis usque ad 1·5 mm. inter se distantibus; segmentis 1–1·75 cm. longis, 3·5–6 mm. latis, sinubus usque ad rachidem attingentibus, venis liberis 8–12 jugis; rachidibus lateralibus spinulis longis, conspicuis, basi costae indutis; segmentis apicem versus spinulas longas ferentibus; soris marginalis, nec ad basin nec apicem attingentibus; indusiis papyraceis, integris, 0·75 mm. latis; sporangiis laevibus, c. 22 cellulis incrassatis in annulo dispositis; sporis tetrahedro-globosis, c. 40μ in diametro, fuscis, rugosis; chromosomatibus gametophyticis 29; chromosomatibus sporophyticis 58; reproductione sexuale. Fig. 3, 3a. Plate 5, fig. E.

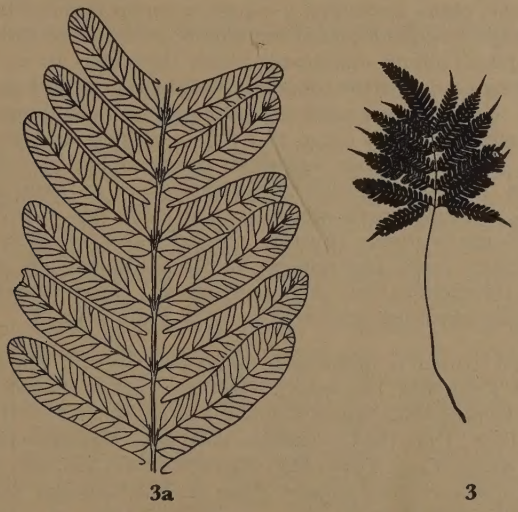


Fig. 3. Silhouette of a frond of *P. praetermissa*, × 1/6; Fig. 3a. Upper surface of pinna of *P. praetermissa*, × 2.

Ceylon: terristris in silvis, c. 1,650 m., Le Vallon Tea Estate, *T. G. Walker* T343 (BM, holotypus).

Ceylon: Galaha, 940 m., Jan. 22, 1954, *F. Schmidt* 1040 (G); Hantane, 1,140 m., Dec. 8, 1950, *F. Ballard* 1047 (K); bank by roadside, 1,200 m., Corbett's Gap, Dec. 9, 1950, *F. Ballard* 1072 (K); on ground in jungle, c. 1,650 m., Le Vallon Tea Estate, Feb. 9, 1954, *T. G. Walker* T363 (BM), T343 (holotype, BM); dense jungle c. 1,650 m., The Knuckles, Jan. 30,

1954, *T. G. Walker* T248 (BM); in thick jungle, Gallebodde Estate, near Ambegamuwa, Jan. 27, 1954, *T. G. Walker* T217 (BM); in very dense jungle, Norton Dam, Jan. 29, 1954, *T. G. Walker* T233, T234 (BM).

This species appears to be endemic in Ceylon.

P. praetermissa may be distinguished from the other Ceylon species of *Pteris* by the following combination of characters:—

(1) the presence of long, conspicuis spinules on the costa
(2) the usually dark colour of the rachis and stipe
(3) the long spinules on the segments
(4) the sinus extending almost to the costa
(5) the spore characters (Plate 5, fig. E).

5. **Pteris** (sect. **Pteris**) **gongalensis** *T. G. Walker*, sp. nov.; e turma *P. quadriauritae* et ex affinitate *P. praetermissae* sed pinnis pinnatifidis nec pinnatisectis.

Rhizomate breve, erecto; stipitibus 18–82 cm. longis, 2·5–6 mm. basi latis, basi leviter scaberulis, stramineis; rachidibus stramineis vel purpurascentibus; laminis obscure viridis, deltoideis, chartaceis, 18–53 cm. longis, 17–35 cm. latis; pinnis lateralibus 4–9 jugis et pinnis terminalibus similibus sed paullo majoribus quam jugum supremum; pinnis lanceolatis vel ovato-lanceolatis; pinnis infimis unifurcatis; pinnis lateralibus 10–25 cm. longis, 1·5–4 cm. latis, pinnatipartitis; pinnarum segmentis 16–29 jugis, usque ad 1 mm. inter se distantibus; segmentis oblongis, 1–2·2 cm. longis, 4–6 mm. latis, apice integris, sinubus usque ad 1 mm. a rachide attingentibus; venis liberis 7–14 jugis; rachidibus lateralibus costorum basi spinulis brevibus indutis, aliter inconspicuis; soris marginalibus, nec ad basin nec apicem attingentibus; indusiis papyraceis, integris; sporangiis laevibus, c. 18 cellulis incrassatis in annulo dispositis; sporis tetrahedro-globosis, c. 51 μ in diametro, obscure fuscis, plus-minusve verrucosis; sporis vivis, abortivisque intermixtis; chromosomatibus gametophyticis 87; chromosomatibus sporophyticis 87; reproductione asexuale. Fig 4, 4a. Plate 5, fig. A.

Ceylon: ad rivulam in umbrosis tenuibus Gongala Hill, juxta Bulantota, *T. G. Walker* T756 (BM, holotypus). Ceylon: Lightly shaded, by stream, c. 1,050 m., Gongala Hill near Bulantota, March, 1954, *T. G. Walker* T756 (holotype), T757, T765 (BM); roadside bank, near Hapugastenne, Jan. 28, 1954, *T. G. Walker* T219, T222 (BM); Corbett's Gap, Jan. 22, 1954, *T. G. Walker* T191 (BM); exposed bank, c. 1,200 m., The Knuckles, Jan. 30, 1954, *T. G. Walker* T246 (BM).

P. gongalensis appears to be endemic to Ceylon and may be distinguished from the other Ceylon species of *Pteris* by the following combination of characters:—

(1) the deltoid frond
(2) spinules throughout are inconspicuous
(3) the very regular appearance of the pinnae
(4) large viable dark brown spores intermixed with misshapen non-viable ones
(5) the sculpturing and size of the spores (Plate 5, fig. G).

4a 4

FIG. 4. Silhouette of a frond of *P. gongalensis*, × 1/6; Fig. 4a. Upper surface of pinna of *P. gongalensis*, × 2.

6. **Pteris** (sect. **Pteris**) **confusa** *T. G. Walker*, sp. nov.; e turma et affinitate *P. quadriauritae* sed segmentorum apicibus integris distincta.

Rhizomate breve, erecto; stipitibus 30–70 cm. longis, basi 2–6 mm. latis, laevibus, stramineis, basi castaneis; laminis obscure viridis, ovatis vel late ovatis, plus-minusve chartaceis, 21–60 cm. longis, 16–40 cm. latis; pinnis lateralibus 4–10 jugis, pinnis terminalibus similibus, sed quam jugum supermum paullo longioribus; pinnis infimis unifurcatis; pinnis 10–27 cm. longis, 2–5·5 cm. latis, pinnatipartitis; pinnarum segmentis 14–25 jugis, 1–2·5 mm. inter se distantibus, oblongis 1–3 cm. longis, 4·5–8 mm. latis, apice integris; sinubus ab rachidem lateralem c. 2 mm. distantibus; venis liberis 9–15 jugis; rachidibus lateralibus spinulas breves basi costae ferentibus; segmentibus spinulas nullas vel inconspicuas gerentibus; soris segmentum marginem totam apice excepta occupantibus; indusiis papyraceis, integris, c. 0·5 mm. latis; sporangiis laevibus, c. 20 cellulis incrassatis in annulo dispositis; sporis tetrahedro-globosis, c. 48μ in diametro, pallide fuscis, tuberculis conspicuis; sporis vivis et abortivis intermixtis; chromosomatibus gametophyticis 58; chromosomatibus sporophyticis 58; reproductione asexuale. Fig. 5, 5a. Plate 5, fig. B.

CEYLON: ad viam in umbris tenuibus basi Montis Adami, *T. G. Walker* T736 (BM, holotypus). CEYLON: In forest in the Hantane Range, *Gardner* 1141 (CGE); Kotmalee 1847, *D. F. Fortescue* (CGE); roads, jungle, 50–60 m., Western Province, Labugama, Jan. 7–8, 1954, *F. Schmidt* 832 (G); edge of jungle by roadside, 2 miles east of Panilkanda, Jan. 24, 1951, *F. Ballard* 1564 (K); on sloping ground under trees, Catchment Area, Kandy, Jan. 14, 1954, *T. G. Walker* T84, T87 (BM); on sloping ground under trees, Catchment Area, Kandy, Feb. 3, 1954, *T. G. Walker* T297, T304 (BM); shady bank under trees, Catchment Area, Kandy, Feb. 8, 1954, *T. G. Walker* T322–T325

(BM); by pathside with very little shade, base of Adam's Peak, March 9, 1954, *T. G. Walker* T736 (holotype), T737, T738 (BM); in strong light on roadside bank, near Gampola, Jan. 29, 1954, *T. G. Walker* T237; by streamside in jungle, c. 900 m., Hunnasgiriya, near Madugoda, Jan. 16, 1954, *T. G. Walker* T103 (BM); in dense shade near Ambegambwe village, Jan. 19, 1954, *T. G. Walker* T132 (BM): *Mrs. Chevalier* s.n.—several specimens on the same sheet of which only one is *P. confusa* (BM).

FIG. 5. Silhouette of a frond of *P. confusa*, × 1/6; Fig. 5a. Upper surface of pinna of *P. confusa*, × 2.

P. confusa may be distinguished from the other Ceylon species of *Pteris* by the following combination of characters:—

(1) the stramineous stipe
(2) the inconspicuous spinules on all parts of the pinnae
(3) the sinus not nearly reaching the costa
(4) the presence of well-filled viable spores intermixed with misshapen abortive ones
(5) the conspicuous spore markings (Plate 5, fig. J).

As noted in the description this is an apogamous diploid species and its cytology was reported in a preliminary way in Manton and Sledge (1954) under the name of *P. linearis* Poir.

In Ceylon *P. confusa* is a distinctive species once its salient characters have been recognised but a source of confusion in the past has been in the fact that in gross morphology it is very like the diploid form of *P. biaurita* sens. lat. which also occurs in Ceylon; the most immediately obvious feature separating the two species being the free venation of *P. confusa* and the basal veins which anastomose and form a costal arch in *P. biaurita*. However, the anastomosing of the veins in *P. biaurita* is dependent upon the condition of the plant in so far as the immature fronds frequently are free-veined and show anasto-

Plate 5

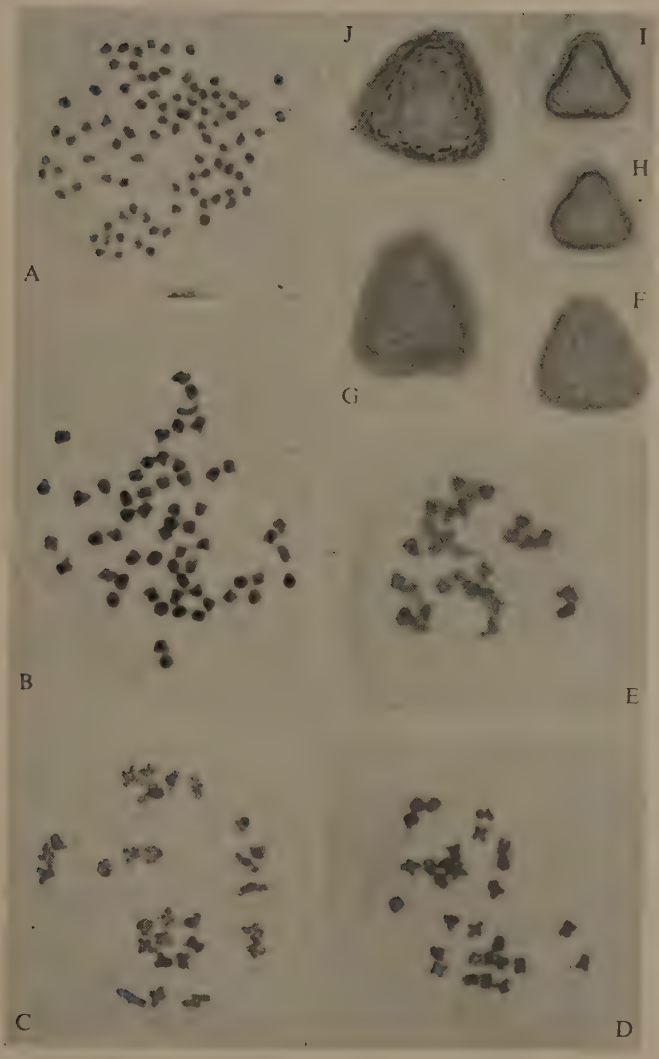


Fig. A. *Pteris gongalensis;* chromosomes at the first meiotic metaphase showing 87 bivalents. Fig. B. *Pteris confusa;* chromosomes at the first meiotic metaphase showing 58 bivalents. Fig. C. *Pteris quadriaurita;* sens. strict.; chromosomes at the first meiotic metaphase showing 29 bivalents. Fig. D. *Pteris reptans;* chromosomes at the first meiotic metaphase showing 29 bivalents. Fig. E. *Pteris praetermissa;* chromosomes at the first meiotic metaphase showing 29 bivalents.

All the above cytological preparations are permanent aceto-carmine squashes, magnification × 1000.

Fig. F. A spore of *Pteris praetermissa.* Fig. G. A viable spore of *Pteris gongalensis.* Fig. H. A spore of *Pteris reptans.* Fig. I. A spore of *Pteris quadriaurita;* sens. strict. Fig. J. A viable spore of *Pteris confusa.*

All the above spores are photographed at a magnification of × 400.

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moses only as the plant matures, but even mature plants if completely defoliated tend to put up new fronds which repeat the normal developmental cycle, passing in succession from free-veined to anastomosed veins with intermediate conditions also present. This fact had been commented upon by Ferguson (1880) and led him to consider that *P. biaurita* was merely a form of *P. quadriaurita* sens. lat. (under the latter name there is little doubt that he knew *P. confusa*). Ferguson's view in my opinion was due to an incomplete understanding of the entire life-history of the two species and there is no doubt whatsoever that they are in fact very different and distinct entities, differing very markedly in such fundamental features as spore characters, the form of the juvenile plants, and in their physiology and breeding reaction with other species of *Pteris*. In respect to the latter I have produced many hybrids between *P. confusa* and a wide range of other species of *Pteris*, whereas *P. biaurita* of Ceylon fails to form hybrids with the same species. Certain aspects of the *P. biaurita* complex will be considered more fully in another paper.

Yet another and biologically more fundamental possible source of taxonomic confusion can occur as a consequence of the fact that *P. confusa* is capable of crossing not only with *P. quadriaurita* sens. strict. but also with *P. multiaurita*, and with any of the segregants of the fertile *P. quadriaurita* × *P. multiaurita* hybrid. Such hybrids show a wide range of gross morphology which has been illustrated (Walker, 1958) and furthermore such di- or trihybrids as a consequence of inheriting the apogamous mode of reproduction of the *P. confusa* parent, breed true indefinitely without segregation, thus effectively masking their proven hybrid origin.

7. *P. argyraea* T. Moore in Gard. Chron. p. 671, 1859.

HOLOTYPE: a living plant from 'Central India' in Hort. Veitch 1859; fragment in Herb. T. Moore, ex India, Nilgiris, coll. *McIvor* (K).

In his detailed review of the *P. quadriaurita* complex Hieronymus (1914) has made an error in his account of *P. argyraea* in that he questions the occurrence of this species in India at all, stating that it has apparently not been collected there again, and further making the suggestion that the Veitch specimen on which Moore based his description did in fact come from Java and not India as stated by Moore. However, the type specimen is clearly annotated as to source and there are relatively numerous specimens in the Herbaria at Kew and the British Museum (Natural History) which had been collected in India several years before the publication of Hieronymus' paper so that one is forced to the conclusion that such a curious statement in an otherwise very painstaking work must have been due to inadequate material at his disposal.

There is also another species of *Pteris* which occurs in Siam and Indonesia and which has been classified as *P. argyraea* and which also has the extremely striking white band extending along the middle of the pinnae. These Siamese and Indonesian plants are very different in appearance from the true *P. argyraea* and but for the presence of the prominent white streak would never have been confused in the first instance.

Thanks to Professor R. E. Holttum the Indonesian plant is now in cultivation and the differences between it and *P. argyraea* are most striking when

the two species are seen growing side by side. The Indonesian plant is to be incorporated into a breeding programme to determine what relationship, if any, it bears to *P. argyraea*.

Plants apparently identical with the true *P. argyraea* occur in Ceylon where I have seen them growing in profusion in the Ambegambwe district near Norton Dam. All specimens cytologically examined have proved to be apogamous diploids (2n = 58).

Acknowledgements

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What is Aeschynomene leptobotrya Harms ex Bak.f.?—In 1929 E. G. Baker described *Aeschynomene leptobotrya*, citing a Transvaal plant, *Wilms* 432, which bore Harms' MS. epithet, as the type, and also a Southern Rhodesian specimen, *Teague* 128. Since then much further material from the eastern mountains of Southern Rhodesia has reached Kew, some labelled *Ae. leptobotrya* and some *Ae. nodulosa* (Bak.) Bak. f., and it seems impossible to find any distinction between the two groups. At the same time South African botanists continue to use *Ae. leptobotrya* for the Transvaal plant, *Ae. nodulosa* being not yet recorded from that country.

An examination of the material leads to the following conclusions:—

(1) *Teague* 128 is *not* conspecific with *Wilms* 432 as E. G. Baker supposed (see Table 1), but is a form of *Ae. nodulosa* with unusually small flowers. All other Southern Rhodesian material named *leptobotrya* is also *nodulosa*, and so also is all such material from the Soutpansberg Mts. in the northern Transvaal.

(2) '*Ae. leptobotrya*' from the central and eastern Transvaal and Swaziland differs from *Ae. nodulosa* in several characters as shown in Table 1 and is certainly specifically distinct. It differs from *Ae. rehmannii* Schinz (1902), however, only in a single character, the glandular indumentum, and occupies the same area. It is, therefore, best regarded as a variety of *Ae. rehmannii*.

(3) Variation parallel to that in *Ae. rehmannii* also occurs in *Ae. nodulosa*. The less common glabrescent variety corresponding to *Ae. rehmannii* var. *rehmannii* has not yet been described.

(4) *Rogers* 10066 which is said to have been collected at Elisabethville and which is the sole basis for the inclusion of *Ae. leptobotrya* in the 'Flore du Congo Belge et du Ruanda-Urundi' seems to be conspecific with *Wilms* 432, although its keel is unusually short (7 mm.). It is not conspecific with *Teague* 128. Its label has been altered from 'S. Africa' to 'Congo' and, as Rogers collected in both the Transvaal and the Katanga, this will seem to be an instance of the displacement of a label unless further material is obtained from the Congo.

TABLE 1. Differences between *Ae. nodulosa* and *Ae. rehmannii* (including *Ae. leptobotrya* s. str.). Figures in brackets after the measurements show the number of specimens in which the character concerned was observable. Measurements were taken in the dried state and should probably be increased slightly for fresh or boiled-up flowers.

Character	*Ae. nodulosa* (excluding *Teague* 128)	*Teague* 128	*Ae. rehmannii*
Height of plant (as noted by collector)	1–5 m. (11)	—	0·5–1·7 m. (5)
Length of keel	14–20 mm. (26)	13 mm.	[7]9–12 mm. (15)
Length of keel as percentage of that of wing	140–170% (25)	160%	90–110% (14)
Length of filaments ...	10–14 mm. (24)	11 mm.	6–8 mm. (18)
Length of style	4–5 mm. (18)	4·5 mm.	2–3 mm. (11)
Length of stipe of pod ...	6–9 mm. (21) (11 mm. on one plant)	7 mm.	9–14 mm. (8)
Length of upper pubescent part of stipe	1–3 mm. (18)	1 mm.	3–8 mm. (8)
Length of basal glabrous part of stipe	4–8 mm. (18)	6 mm.	4–6 mm. (8)
Maximum No. of segments of pod or of maturing ovules in half-developed fruits ...	4–6 (18)	4	2–3 (10)

1. **Ae. nodulosa** (*Bak.*) *Bak.f.* in Journ. Linn. Soc. Bot. **40**, 56 (1911); Leg. Trop. Afr. 291 (1929)

Smithia nodulosa Bak. in Fl. Trop. Afr. **2**, 153 (1871)

α var. **nodulosa**

Ae. shirensis Taub. in Engl., Pflanzenw. Ost Afr. **C**, 215 (1895)

Ae. leptobotrya Harms ex Bak.f., Leg. Trop. Afr. 298 (1929), pro parte; sensu Hutch., Botanist in S. Afr. 304, 344 (1946)

Nyasaland. Mt. Chiradzura [Chiradzulu] NE. of Blantyre, Sept. 1861, *Meller* s.n., holotype & *Whyte* s.n.; Shire highlands, 1891, *Buchanan* s.n., isotype of *Ae. shirensis*, & *Buchanan* 564; Zomba, *Buchanan* 126.

Southern Rhodesia. Makoni District: *Eyles* 746; Marandellas District: *Wild* 3284; Belingwe District: *Wild* 4318; Inyanga District: *Henkel in Eyles* 2572 partly; Umtali District: *Teague* 128, *Eyles* 3603, *Peter* 30853, *Dept. Agr.* 1389, *E. A. Bruce* 208, *Chase* 2158, 5294; Melsetter District: *Swynnerton* 619, *Williams* 92, *Crook* M52.

Portuguese E. Africa. Chimanimani Mts., *Wild* 2925.

Transvaal. Soutpansberg, *Hutchinson* 2010, *Hutchinson & Gillett* 4184, *Pole Evans* 3768, *Galpin* 14896, *Meeuse* 9706.

β var. **glabrescens** *Gillett*, var. nov.

A var. *nodulosa* inflorescentiis fructibusque glabris, vel fere glabris, differt.

Southern Rhodesia. Inyanga District: near Nyamingura R., 1000 m., chief shrubby constituent of scrub, 23 Apr. 1958, *J. B. Phipps* 1232, K, holotype, SRGH, isotype. Inyanga, common shrub on forest margins and in open veldt, August, *Henkel in Eyles* 2572 partly.

Transvaal. Soutpansberg, 28 km. NE. of Sibasa on road to Sambandou, 600 m., sandy moist soil by streams, 2 Feb. 1952, *Codd* 6888:—slender semi-woody plant c. 3 m. tall.

It is remarkable that whereas 5 specimens of *Ae. nodulosa* were collected in Nyasaland before 1895 none have been seen from that country since then.

2. **Ae. rehmannii** *Schinz* in Bull. Herb. Boiss., Sér. 2, **2**, 947 (1902); Burtt Davy, Man. Fl. Pl. Transvaal **2**, 426 (1932)

α var. **rehmannii**

Transvaal. Houtbosch, *Rehmann* 6285, Z, holotype; Barberton, *Galpin* 778; sine loc., *Worsdell* s.n.

Swaziland. Mbabane, *Burtt Davy* 2821.

β var. **leptobotrya** (*Harms ex Bak.f.*) *Gillett*, stat. nov.

Ae. glutinosa Schinz, *l.c.* (1902), non Taub. (1896)

Ae. leptobotrya Harms ex Bak.f., Leg. Trop. Afr. 298 (1929), sensus stricto, quoad typum; sensu Burtt Davy, *l.c.*; sensu J. Léonard in Fl. Congo Belge **5**, 270 (1954)

? Belgian Congo. ?Elisabethville, ?*Rogers* 10066 (see (4) on p. 333).

Transvaal. Lydenberg, *Wilms* 432, holotype; Houtbosch, *Rehmann* 6285/A, Z, type of *Ae. glutinosa* Schinz. 'lay on one sheet with 6285'. *Atherstone* s.n., *Rogers* 14967, 22026, *Mason* 37, *Thode* A1310, *Galpin* 12515, 14608, *Liebenberg* 3337, *Codd* 4816, *v. d. Schijff* 2099, *Strey* 3023.

Swaziland. *Compton* 27500.

The author's thanks are due to Prof. Dr. F. Markgraf for kindly loaning the types of *Ae. rehmannii* and *Ae. glutinosa* Schinz from the Zurich University Museum.

J. B. Gillett

Notes from the East African Herbarium: X*

B. Verdcourt (East African Herbarium, Nairobi)

NOTES ON AFRICAN CONVOLVULACEAE: IV†

New genus near *Hildebrandtia* Vatke

Mention should perhaps be made of a remarkable plant collected by Mr. O. West in Ethiopia during the 1939–45 war. The material is inadequate for description but was collected under difficulties. It is of interest from an evolutionary point of view. The outer sepals are united into an entire disc. The two inner sepals are minute. There are five filaments and two free styles with hippocrepiform stigmas. Every effort should be made to collect adequate material of this plant. Mr. C. F. Hemming has made an intensive search for it but he failed to find it.

Ethiopia. Ogaden, hills north of Gabredarre, 6°40′N., 44°20′ E., 13 March 1941, *West* 5424 (EA, PRE):—shrub 2·4 m. tall.

Seddera Hochst.

Seddera glomerata (*Balf. f.*) *Schwartz* in Mitt. Inst. Allgem. Bot. Hamburg **10**, 197 (1939)

Somaliland Protectorate. Eastern Al Medu Range, Baditir, rocky slopes, 1170 m., 9 Oct. 1956, *Bally* 10966 (EA, K):—woody dwarf plant to 10 cm. tall with tufted habit; leaves silvery; inflorescences spherical, silvery.

S. bagshawei *Rendle* in Journ. Bot. **46**, 177 (1908)

Ethiopia (?). Harar, from Gildessa to Zeila, 1889, *Bricchetti* 33 (FI).

The above plant forms part of a sheet borrowed from Florence. It has been determined by Hallier f. as *Hildebrandtia somalensis* Engl. ♀, and part of the sheet is that. The labels are confusing since there is also a label 'Schweinfurth . . . ' Hallier f. started to write *Seddera* and then deleted it. If the locality is correct for both components of the sheet then this is the first record of *S. bagshawei* outside of Tanganyika and Uganda. *Ostini & Buscalioni* 627 (Havasch, 7 Feb. 1916, FI) and *Ostini & Buscalioni* 573 (Harar to Dire Dawa, 6 Nov. 1916, FI) are both possibly only forms of this species.

S. bagshawei is recorded from the Sudan by Andrews (Fl. Pl. Sudan **3**, 127: 1956), the record being based on a specimen in the Kew Herbarium from Mongalla, Bahr el Jebel, 10 Dec. 1909, *Broun* 1716. Chiovenda also records this species from Neghelli in Ethiopia (Miss. Biol. Borana, Angiosp.-Gymnosp. 171: 1939).

S. hirsuta *Hall. f.* in Ann. Ist. Bot. Roma **7**, 224 (1898)

var. **gracilis** (*Chiov.*) *Verdc.* in Kew Bull. **12**, 341 (1957)

Somalia. Boscaglia del Caschei, lungo da strada per atama, 10 July 1939, *Corradi* 2486 (FI) and Caschei, comunissima in Boscaglia. In Scianghetta, Desscia, 6 July 1939, *Corradi* 2549 (FI).

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* Continued from Kew Bull. **13**, 223 (1958)

† Continued from Kew Bull. **13**, 217 (1958)

KENYA. Garissa District: Ijara, in scrub, 13 Jan. 1943, *Bally* 2180 (EA):—straggling shrub.

var. **glabrescens** *Verdc.*, var. nov. a planta typica sepalis sparse adpresse pilosis, non villosis, differt.

Herba perennis; caules lignosi, virides vel brunnei, ramosi, lenticellati et leviter tuberculati; rami juveniles pilosi. *Internodia* 2–10 mm. longa. *Folia* oblongo-elliptica, basi cuneata, apice rotundata, apiculata, 6·5–15 mm. longa et 3·5–7·5 mm. lata, ± glabrescentia vel sparse pilosa, petiolo brevi, 2 mm. longo, supra canaliculato; nervi laterales 3–4, non obscuri, utrinque leviter prominentes. *Flores* axillares, ± sessiles, solitarii, non numerosi. *Calyx* ± urceolatus; sepala apice reflexa, elliptica, ± acuta, 3–8-nervia, 5–5·2 mm. longa et 1·8–2·2 mm. lata, sparse appresse pilosa. *Corolla* infundibuliformis, 7 mm. longa; lobi late ovati, rotundati, 2·5 mm. longi et 4 mm. lati, extra pilosi. *Filamenta* 3 mm. longa, basi complanata; antherae 1·2 mm. longae. *Styli* 2, 5 mm. longi; stigmata peltata, 0·4 mm. lata. *Ovarium* ovoideum, 1 mm. altum, dense hirsutum. *Capsula* globosa, apice acuta, pilosa, 5–6 mm. alta, pedicello 3–4 mm. longo. *Semina* 2·7 mm. longa et 1·5 mm. lata, glabra.

TANGANYIKA. Northern Province, Mbulu District: Taringire River, level ground on brown sandy 'hard pan' soil, 1140 m., 14 Mar. 1958, *Lamprey* 344 (EA, holotype of variety, K, isotype):— low 'scandent' (*sic*) subshrub spreading widely amongst *Acacia drepanolobium*, *Cyathula merkeri*, *Sporobolus* etc., and same locality, on similar ground, 1080 m., 14 May 1958, *Lamprey* 389 (EA, K):—subshrub to 22·5 cm., spreading on small patches of bare ground, amongst *Acacia drepanolobium* trees; flowers white.

This variety is very distinct from typical *S. hirsuta* but is very similar in habit and branching to *S. hirsuta* var. *gracilis* (Chiov.) Verdc. Further material is required to investigate the status of the plant.

S. hirsuta var. *glabrescens* is also closely related to the Indian *S. evolvuloïdes* (Choisy) Wight and one wonders if it is closer to the original form of the species than to var. *hirsuta*. *S. evolvuloïdes* has rather smaller flowers than *S. hirsuta* var. *glabrescens*, also more graceful, less hairy branchlets but the two are closely allied. The synonymy of the Indian species is as follows:—

S. evolvuloïdes (*Choisy*) *Wight*, Icon. **4**(2), 13, t. 1369 (1848)

Breweria evolvuloïdes Choisy in Mém. Soc. Phys. Nat. Genève **6**, 494 (1834) and in DC., Prodr. **9**, 439 (1845), *non* R.Br. (1814) *nomen nudum*
B. choisyana Steud., Nomencl., ed. 2, **1**, 224 (1840), *nomen illegitemum*

S. latifolia *Hochst. & Steud.* in Flora **27**, Beil. 8, t. 5, fig. B & C (1844)

var. **argentea** (*A. Terrac.*) *Capua* in Ann. Ist. Bot. Roma **8**, 221 (1903)

Breweria argentea A. Terrac. in Ann. Ist. Bot. Roma **5**, 105 (1893*)

ETHIOPIA. Fortino di Dande, 1 Aug. 1939, *Corradi* 2481, 2483 & 2488 (FI); El Meti to El Dire, 24 May 1939, *Corradi* 2487 (FI).

KENYA. Northern Frontier Province: Isiolo, May 1931, *Veterinary Officer* 1617 (K). Masai District: foot of Ol Lorgasailic, on pebbly ground, 1170 m., 27 May 1956, *Bally* 10555 (EA, K). I saw the plant in this locality after heavy rain in May 1958, but not in flower).

* Despite date 1894 on the cover of fascicle 3 it was received at Kew on 18th Nov., 1893.

A new species of *Astripomoea* Meeuse

In Kew Bull. **13**, 189 (1958) I gave a brief synopsis of the genus *Astripomoea* Meeuse and two species were left undescribed owing to the scarcity of the material available. During a recent safari to the Northern Frontier Province, Kenya, I collected abundant material of one of these plants thus enabling a description to be drawn up.

Astripomoea longituba *Verdc.*, sp. nov. affinis *A. tubiflorae* (Hall. f.) Verdc., habitu procumbente, floribus axillaribus solitariis, alabastris extra glabris, sepalis exterioribus majoribus differt.

Herba perennis, circa 0·3 m. alta, caulibus pluribus decumbentibus c. 1 m. longis brunneo-tomentosis demum glabrescentibus cortice desquamante, e radice lignosa ortis. *Internodia* 0·6 cm. longa. *Folia* orbicularia vel rectangulari-reniformia, apice rotundata vel subacuta, minute apiculata, basi cordata, utrinque griseo-stellato-tomentosa, margine integra, leviter lobata vel grosse dentata, 1·3–4·0 cm. longa et 1·3–3·7 cm. lata, petiolis 0·7–3·5 cm. longis, nervis lateralibus utrinsecus 5–6. *Flores* axillares, solitarii; pedunculi 0·8–2·4 cm. longi; pedicelli circa 8 mm. longi; bracteae oblongo-ellipticae vel cymbiformes, nervosae, basi angustae, apice acutae vel obtusae, minute apiculatae, utrinque tomentosae, 2·1–3·7 cm. longae et 0·9–1·4 cm. latae. *Sepala* 5; 3 exteriora ovata vel oblongo-rotundata, intus glabra, extra griseo-tomentosa, 10–15 mm. longa et 7–12 mm. lata; 2 interiora lanceolata vel oblongo-lanceolata, apice acuta, 10 mm. longa et 4 mm. lata, intus glabra, extra medio griseo-tomentosa. *Corolla* alba, extra glabra; tubus anguste cylindricus, 4·2–6·0 cm. longus et 2–4·5 mm. latus; limbus infundibuliformis circa 3 cm. longus et 4·8–6 cm. latus, margine undulatus. *Stamina* dimorpha, 3 breviora, filamentis 3·6–3·9 cm. longis, 2 longiora, filamentis 4·2–4·8 cm. longis, antheris 5 mm. longis. *Capsula* subglobosa, glabra, straminea, 1·3–1·5 cm. alta et 1·0 cm. lata, pedicello incrassato, sepalis persistentibus, 1·4–1·6 cm. longis. *Semina* ovoidea, brunnea, breviter griseo-lanata, 7 mm. longa et 4·25–5·5 mm. lata.

Kenya. Northern Frontier Province: Uaso Nyiro, open desert plains, 900 m., *Hayett* 21 (K):—usually lies flat on the ground but can climb other plants, flowers white, 'Kalacha' (Boran), & 38 km. N. of Isiolo in scattered *Acacia*-desert grass association on brown sandy soil (common for many kilometres beyond the point where collected, particularly at the road-edges), 22 July 1958, *Verdcourt* 2209 (EA, holotype, BM, BR, FI, LISC, K, P, PRE, U, isotypes):—woody herb with many spreading decumbent shoots from a tough rootstock about 0·3 m. tall and shoots about 1 m. long; several flowers aberrant with the corolla-tube abnormally short (about 2·3 cm. long) and the genitalia exserted, & SE. of Samburu Hills, between Seya and Barsalinga, *Pratt* 352 (EA).

Further notes on '*Ipomoea asperifolia* Hall. f.'

In Kew Bull. **13**, 202 (1958) I mentioned that this species was part of a complex which would need drastic sorting in connection with the various African regional Floras now being prepared. The collection of additional material in southern Tanganyika belonging to the complex has necessitated further work immediately. I agree with Dr. Meeuse (Bothalia **6**, 732: 1958) that *I. asperifolia* and *I. crassipes* Hook. are closely allied; the latter species is also an intensely variable one. The two almost merge together and some variants might be treated under either name. The extremes are, however, too dissimilar for one specific name to suffice. The name *I. asperi-*

folia must sink into *I. fulvicaulis* (Choisy) Hall.f. at specific level. The name-changes made here mostly refer to the East African flora and other synonymies are tentatively suggested. A very great deal of field-work needs to be carried out before finality can be reached. Some points needing clarification in the field are mentioned below.

The main characters of use in this complex appear to be (a) indumentum, (b) leaf shape, (c) length of peduncles, (d) size of bracts, (e) number of flowers and (f) shape of sepals. The shape of the corolla is useful. *I. blepharophylla* Hall. f. can easily be distinguished from this complex, throughout its range from Ethiopia to Angola, by the almost sessile flowers and the corolla which is distinctively narrowed below. *I. kilwaënsis* Pilger, of which a badly preserved isotype is in the East African Herbarium, and which is otherwise similar to *I. crassipes*, also has a similar, basally narrowed corolla. The following variants within the *fulvicaulis–crassipes* complex may be mentioned.

ipomoea fulvicaulIs (*Choisp*) *Hall. f.* in Engl., Bot. Jahrb. **18**, 128 (1893)

1. var. **fulvicaulis**

Stems yellow-brown pubescent. Leaves elliptic-ovate, obtuse at the apex, cordate or truncate at the base, densely pubescent above and below; petiole short or often almost as long as the leaf blade. Peduncles 1–4·5 cm. long. Bracts ovate-acuminate, 1·5 cm. long and 0·65 cm. wide. Flowers few in small heads. Sepals ovate, acute, up to 1·3 cm. long. Corolla rather short, about 2·5 cm. long.

2. var. **asperifolia** (*Hall. f.*) *Verdc.*, comb. nov.

I. asperifolia Hall. f. in Engl., Bot. Jahrb. **18**, 128 (1893)

Leaves, stems and indumentum similar to var. *fulvicaulis* but the indumentum tends to be shorter. Petioles usually short, rarely up to half as long as the leaf-blades. Peduncles usually short, sometimes up to 2·5 cm. long. Bracts linear, about 6–7 mm. long and 1 mm. wide. Flowers usually solitary, sometimes paired. Sepals ovate to lanceolate, acute, up to 1·2 cm. long and 5 mm. wide. Corolla rather short, about 2·5 cm. long.

3. Between var. *fulvicaulis* and var. *asperifolia* intermediates are quite common, e.g. *Ward* 35 from Tanganyika, Iringa District, Iheme has the bracts 5 × 2 mm. and the sepals 9 × 4 mm. The peduncles and petioles are very short, the flowers solitary and the corolla short. It is clearly closer to var. *asperifolia*. *Richards* 6988 from Tanganyika, Ufipa District, Sumbawanga has more the characters of var. *fulvicaulis*. The bracts are 9 × 4–6 mm., the sepals 14 × 7–9 mm., the flowers either solitary or in small heads on peduncles up to 2·5 cm. long and the corolla is about 3 cm. long.

4. *I. crassipes* Hook. var. *hirta* Hall. f. in Baum, Kunene-Sambesi-Exped. 346 (1903) is a form intermediate between *I. fulvicaulis* var. *asperifolia* and *I. crassipes*. The indumentum is that of the former but the peduncles are 0·5–7 cm. long; the bracts are small and linear but the sepals large up to 1·8 cm. long and the corolla is about 4 cm. long.

5. The taxa in this complex all have several stems from a woody rootstock and it is well-known that many such plants can flower after burns when only

a few centimetres tall; later after rains, long flowering shoots are produced which are quite dissimilar. There are several plants allied to *I. fulvicaulis* var. *asperifolia* which show this behaviour. It is rather difficult to know if they belong to a race which is thus characterised or whether other forms from different localities would also show the behaviour under similar conditions. In Southern Rhodesia var. *asperifolia* often flowers when only 8 cm. tall (e.g. *Brain* 5469 from Salisbury) and some of Welwitsch's Angola material also consists of short shoots. In these, however, the flowers are solitary. There are other rather distinctive short forms where the flowers appear to be aggregated. This aggregation may be a result of the conditions and long flowering shoots might show only solitary flowers. Collections showing the development of these forms under different climatic conditions are needed to throw light on this problem. *I. scotellii* Rendle in Journ. Bot. **39**, 18 (1901) is an example of a plant with aggregated flowers. It may prove to be a state of var. *asperifolia* or be entitled to varietal rank. I have examined an isotype of *I. scotellii*. It was flowering when about 7 cm. tall and before any long stems had been sent out. The indumentum is exactly that of var. *asperifolia*. The leaves are ovate-cordate and very obtuse at the apex, the bracts small and linear, and the sepals 8–10 × 4–5 mm. The flowers are aggregated, subsessile or shortly pedunculate; on longer shoots they would quite clearly be much more pedunculate. The corollas on the type are not mature (2·2 cm. long) and certainly appear to be tubular-infundibuliform and very narrow at the base as stated by Rendle. I believe this is due to immaturity of the flowers which have been dissected when in bud. Further material from Urundi (the vague type-locality) is required. *White* 3208 (Northern Rhodesia, Solwezi) is very similar to *I. scotellii* save for the rather wider bracts. *Richards* 2048 (Northern Rhodesia, Mpulungu–Kasama road) is a glabrescent form of the same sort of plant. It flowered when only 5 cm. high, although some much longer shoots had appeared. The leaves are 3·3 × 1·45 cm., almost glabrous above; the bracts are linear or up to 11 × 2·5 mm. The sepals are ovate, 12·5 × 6 mm. and the corollas 3–3·5 cm. long. It may possibly be a young stage of the plant described from Mussumba in the SW. Congo Republic as *I. hypoöantha* Hall. f. I have not seen the type (*Pogge* 334) and it may not now exist; the flowers are said to be solitary but the leaves are glabrescent above and the bracts linear.

6. Elongate-leaved forms of *I. fulvicaulis* var. *asperifolia* are not uncommon, e.g. *Wild* 3987 (Southern Rhodesia, Darwin) with leaves 5·2 × 1·1 cm. These forms are close to *I. porrecta* Rendle & Britten (which is mentioned later) but that differs by its longer, several-flowered peduncles.

I. crassipes *Hook.* in Curt., Bot. Mag. **70**, t. 4068 (1844)

1. var. **crassipes**

Stems pilose or hirsute, hairs usually longer than in *I. fulvicaulis* and its varieties. Leaves very variable, lanceolate to oblong or ovate, cuneate or truncate at the base, glabrous to densely pilose with long hairs, petiole usually short. Peduncles mostly rather long, up to 5 cm. long. Flowers solitary or paired. Bracts variable, linear to ovate, 4–20 mm. long and 1–9 mm. wide. Sepals 1–22 mm. long and 7–10·5 mm. wide. Corolla 2·7–5 cm. long. (This includes var. *shirensis* Bak. and var. *ukambensis* (Vatke) Hall. f.)

Meeuse (Bothalia **6**, 730: 1958) includes *Ipomoea adumbrata* Rendle & Britten, *I. greenstockii* Rendle, *I. sarmentacea* Rendle and *I. bellecomans* Rendle in the synonymy of the typical form.

2. var. **hewittioïdes** (*Hall. f.*) *Hall. f.* in Bull. Herb. Boiss. **7**, 49 (1899)

I. hewittioïdes Hall. f. in Engl., Bot. Jahrb. **18**, 127 (1893)
I. andongensis Rendle & Britten in Journ. Bot. **32**, 121 (1894)

This differs from var. *crassipes* in several respects. The leaves are large, up to 8 cm. long and 4·6 cm. wide, subcordate, glabrous or pilose. The peduncles are 3–7 cm. long. The flowers are in small heads; bracts 1·2–1·4 cm. long and 5–10 mm. wide. The sepals are 1·5–2·2 cm. long and 7–11 mm. wide; the corolla is 3·9–5 cm. long.

This variety is very similar to *I. fulvicaulis* var. *fulvicaulis*, differing in indumentum, the often longer peduncles and longer corollas. It might, however, be equally considered a variety of either species and the names I am adopting are for convenience. Intermediates do not appear to be frequent but I have seen relatively little material of the whole group.

3. **I. porrecta** *Rendle & Britten* in Journ. Bot. **32**, 172 (1894)

This is undoubtedly closely allied to both *I. crassipes* and *I. fulvicaulis* but I have refrained from creating a varietal name until more material is available. It is very similar to *I. crassipes* var. *hewittioïdes* in its several-flowered inflorescences on long peduncles (1–13 cm. long). The leaves are narrowly oblong or elliptic with a subcordate base, about 5·5 cm. long and 1·9 cm. wide. The bracts are narrow, 10 × 1·5 mm. and placed just below the inflorescence; the sepals are also narrow, about 15 × 4·5 mm. The corolla is 4·2 cm. long. The indumentum is short and the plant is clearly closely related to narrow-leaved forms of *I. fulvicaulis* var. *asperifolia*.

There are several unnamed plants from Southern Tanganyika and Northern Rhodesia which scarcely fit into the above scheme. *Milne-Redhead & Taylor* 8447 (Tanganyika, Songea District, near Gumbiro) is a form of *I. crassipes* with erect or prostrate shoots. The leaf shape, dense long indumentum, long peduncles and large corolla are quite typical of *I. crassipes* but the sepals are much narrower than usual. I regard this as merely an individual variant. Number 9053 collected by the same collectors in *Brachystegia–Uapaca* woodland near Kitai also in Songea District is, however, a much more puzzling plant. It shows affinity with *I. crassipes*, *I. blepharophylla* and *I. fulvicaulis* var. *asperifolia*. The corolla is not narrowed at the base as in *I. blepharophylla* and the peduncles are longer; the leaves are, however, similar. The sepals, bracts and indumentum do not fit either of the other two taxa; I suspect it may be of hybrid origin but more material is necessary. The stems are prostrate, about 1 m. long, fairly densely covered with yellowish, bristly hairs; the leaves are narrowly oblong, acute at the apex, slightly narrowed in the lower quarter to a minutely subcordate base, about 5 cm. long and 1·3 cm. wide, glabrescent above save for a few bristly hairs on the midrib, and with bristly hairs on the veins beneath; petiole about 7 mm. long. The peduncles are about 1·5 cm. long, pedicels 5 mm. long; bracts linear, 3–4 mm. long; flowers solitary; sepals lanceolate or ovate, 11–12 mm. long and 2·5–6 mm. wide; and the corolla 3·5–4·5 cm. long. *Fanshawe* 2515

(Northern Rhodesia, Chingola) is somewhat intermediate between *I. crassipes* and *I. fulvicaulis* var. *asperifolia*. It has the short indumentum and linear bracts of the latter but the long peduncles (3·5 cm.) and longer corollas (4 cm.) of the former. The leaves are ovate-cordate, about 2·7 cm. long and 1·4 cm. wide, glabrescent above. The flowers are solitary and the sepals ovate, 11 × 6 mm. It may possibly be *I. hypoxantha* Hall. f. and if so this name could be used in varietal rank under *I. fulvicaulis*. Topotypic material is required.

There is a member of the *Ipomoea fulvicaulis* complex in the highlands of West Africa which bears some resemblance to *I. tenuirostris* Choisy; its status must await revision of the family for the 'Flora of West Tropical Africa'.

I am indebted to the authorities of the herbaria at Coimbra, Kew and Lisbon University for their courtesy in loaning me various type-materials. I have seen type-material of all the taxa mentioned save that of *I. hypoxantha*.

IPOMOEA L.

Ipomoea wightii (*Wall.*) *Choisy* in Mém. Soc. Phys. Genève **6**, 470 (1833)

var. **obtusisepala** *Verdc.*, var. nov. a planta typica foliis rotundatis, subtus densissime albo-tomentosis, sepalis oblongis vel ovatis, obtusis non acuminatis, 8 mm. longis et 3 mm. latis, differt.

Tanganyika. Njombe District: About 25 km. S. of Njombe in bushland, 1740 m., 10 July 1956, *Milne-Redhead & Taylor* 11108 (EA, isotype, K, holotype of variety):—perennial twiner to 1·2 m., stems yellowish-green tinged dark reddish-purple, leaves rugose, yellowish-green above, creamy-white beneath with rusty indumentum on prominent nerves; calyx dull green, tinged reddish-purple, corolla pale mauve with green stripes outside, stamens and pistil pale mauve.

I. pharbitiformis *Bak.* in Bull. Misc. Inf. Kew **1895**, 291 (1895)

Northern Rhodesia. Abercorn District: Lumi River flats, on termite-hills in dambo on heavy soil, 1500 m., 17 Aug. 1956, *Richards* 5847 (EA, K):—vigorous herbaceous climber on trees, etc.; flowers mauve; and Kambole Escarpment, bed of stream which falls down the escarpment, in dense vegetation, 1500 m., 23 Aug. 1956, *Richards* 5926 (EA, K):—vigorous climber reaching up to 15 m. in trees; flowers mauve with deeper mauve centre.

I. tuberculata *Ker-Gawl.* in Edwards, Bot. Reg. **1**, t. 86 (Feb. 1816)

var. **odontosepala** (*Bak.*) *Verdc.*, comb. nov.

I. odontosepala Bak. in Bull. Misc. Inf. Kew **1894**, 73 (1894)
I. dasysperma Jacq., Eclog. **1**, 132, t. 89 (Aug. 1816) var. *odontosepala* (Bak.) Verdc. in Kew Bull. **13**, 214 (1958)

Dr. W. T. Stearn has kindly pointed out the relative dates of publication which render the above change necessary.

I. bakeri *Britten* in Journ. Bot. **32**, 85 (1894)

This species is little known and I had seen only the type but Mrs. Richards has recently collected a range of material.

Northern Rhodesia. Abercorn District: road to Isoko Village, in bush, 1200 m. 31 Jan. 1955, *Richards* 4299 (EA, K):—bushy plant 1·35 m. tall, leaves grey beneath, flowers pale mauve, shaded darker mauve; Chilongowelo, bush by firebreak in woodland on loam soil, 1500 m., 13 Jan. 1955, *Richards* 4056 (EA, K):—herbaceous plant with woody stems, 1·2 m. tall, leaves grey-green, hairy, calyx hairy, flowers pale mauve, shaded with deeper mauve; Dhul'miti, edge of bush, 1500 m., 9 Jan. 1957, *Richards* 8057 (EA, K):—plant 0·9–1·2 m. tall, flowers pale pink and rich lilac; Mpulungu, in *Brachystegia–Julbernardia–Monotes–*

Pterocarpus woodland, Jan. 1955, *Lawton* 142 (EA, K):—shrub 0·9–1·2 m. tall, leaves dull green, silvery beneath, two green glands at the base of lamina, corolla white outside, purple inside.

I. adenioïdes *Schinz* in Verh. Bot. Ver. Brand. **30**, 270 (1888)

var. **ovato-lanceolato** Hall. f. in Ann. Ist. Bot. Roma **7**, 235 (1898)

The record of this distinctive member of section *Poliothamnus* (Hall. f.) Verdc. from North East Tropical Africa has long rested on the single type-specimen collected by *Robecchi-Bricchetti* (No. 499) in the Nogal, Somalia. Recently a specimen has been collected in the Ogaden and I borrowed the type to confirm my determination. The largest leaf on the type is ovate-lanceolate, 8·5 cm. long and 3·5 cm. wide; the largest leaves on the Ogaden specimen are 9·5 × 5·3 cm. and 8·5 × 6·2 cm. The young shoots in var. *ovato-lanceolata* seem much shorter and more densely velutinous than in var. *adenioïdes*. I have seen very little material of either plant but I suspect that var. *ovato-lanceolata* is a much larger shrub altogether and possibly specifically distinct. Until each has been seen in the field by the same person, or good photographs are available and ripe fruits have been collected, I intend to leave the matter. At least the two are good geographical subspecies, which once again show the affinity between the floras of the Ogaden area and South West Africa.

Somalia. Nogal, 1890, *Robecchi-Bricchetti* 499 (FI, holotype of var. *ovato-lanceolata*).

Ethiopia. Ogaden, near Gabredarre, Nov. 1957, *C. Ashall* CA/2/58 (EA):—small tree (*sic.*) with white flowers; note in the dry state flowering shoots are very wrinkled, about 13 mm. diameter 20 cm. below the apex.

A new record for *Turbinia stenosiphon*

Turbina stenosiphon (*Hall. f.*) *Meeuse* in Bothalia **6**, 783 (1958)

var. **pubescens** *Verdc.* in Kew Bull. **13**, 217 (1958)

Northern Rhodesia. Abercorn District: Kalambo River, Sansia Falls, in crevices of rocks at edge of river below spray of falls, soil damp, 1350 m., 28 Mar. 1957, *Richards* 8925 (EA, K).

Clerodendrum makanjanum and C. wildii.—A *Clerodendrum* from the Soutpansberg District of the Transvaal has recently been illustrated in 'Flowering Plants of Africa' (t. 1274: 1958) as *C. makanjanum* Winkler, *C. wildii* Moldenke being cited as a synonym. The type of *C. makanjanum* seems to have been destroyed in the 1939–45 War but some ten specimens from NE. Tanganyika and SE. Kenya, an area including the type-locality, which seem to have been correctly identified as *C. makanjanum* have been examined and are found to differ consistently in the characters listed below, from *C. wildii*, which occupies an entirely separate area. In these circumstances it seems clear that *C. wildii* should be retained as a distinct species, at least until experimental evidence is produced that it is freely interfertile with *C. makanjanum*, in which case subspecific status might be appropriate. It may be remarked in passing that a third species, *C. kissakense* Guerke (1900), appears from the description to be closer to *C. wildii* than is *C. makanjanum*. However its type was also destroyed in the War and no authentic material has been seen. Until this species has been re-collected from the type-locality, Kissaki south of the Uluguru Mts. in eastern Tanganyika, it would appear unwise to identify it with *C. wildii*.

Regarding the habit of *C. wildii*, Dr. H. Wild, who has collected this species several times, states that he has never seen it climbing or straggling. No other collector described *C. wildii* as climbing or straggling though one says it is 'untidy and spreading'. Of nine collectors who refer to the habit of *C. makanjanum*, five state that it is climbing or straggling over other bushes while the other four do not specifically say that it is erect.

The following table shows the principal differences in the flowers of the two species:—

TABLE 1. Comparison of the floral dimensions

	C. wildii	*C. makanjanum*
Width of last year's stem just below inflorescence	c. 2·5 mm.	c. 1·5 mm.
Length of lower inflorescence branches ...	often up to 3–5 mm.	1–2 mm.
Internodes of inflorescence	up to 15 or 20 mm. long, glabrous or more often tomentellous.	up to 10 mm. long, glabrous.
Length of flowering calyx	4–6 mm.	c. 3 mm.
Length of stamens in open flower	17–25 mm.	10–14 mm.
Length of anthers ...	c. 4 mm.	c. 2 mm.
Width of fruit	8–9 mm.	c. 6 mm.

1. **C. makanjanum** *Winkler* in Fedde, Rep. **18**, 124 (1922); B. Thomas in Engl., Bot. Jahrb. **68**, 88 (1936); Brenan, Check-list Trees & Shrubs Tanganyika Terr. **2**, 631 (1949); non sensu Meeuse, Fl. Pl. Afr. **32**, t. 1274 (1958).

KENYA. Kitui District: Mutha plains, *Joana in Bally* 7500!. Teita District: Maungu, *Dale* 3785!; 7 km. E. of Mwatete, *Drummond & Hemsley* 4416!; N. of Voi cemetery, *Ossent* 106! Kilifi District: Bamba 40 km. inland from Kilifi, *Bally* 8544!

TANGANYIKA. Pare District: between Makania and Same, 1 Sept. 1910, *Winkler* 3797 BRSL†, holotype, & *Winkler* 3766, BRSL!; Kifaru hill, *Bally* 5750!; Mbalu hill near Mkomazi, *Bally* 5751!; between Lembeni and Same, *Bally* 11369!; E. of Kihinro, *Engler* 1517†. Lushoto District: Mazinde, *Drummond & Hemsley* 2330!. Handeni District: N. of Mgera, *Burtt* 4920!

2. **C. wildii** *Moldenke* in Phytologia **2**, 110 (1949)
[*C. makanjanum* sensu Meeuse, Fl. Pl. Afr. **32**, t. 1274 (1958), non Winkler]

NYASALAND. *McClounie* 167!

† Specimen now destroyed.

Southern Rhodesia. *Eyles* 3187!, *Whellan in S.R.G.H.* 21940!; *Chase* 1349!; *Wild* 1255!, 2846; *Pole Evans & Erens* 1909!

Bechuanaland. Ngamiland, *Pole Evans* 4597!

Northern Rhodesia. *Rogers* 8514! *Macaulay* 879 p.p.!; *C. Sandwith* 45!; *Milne-Redhead* 1236!; *Walton in C.R.S.* 406!; *King* 138!; *Robinson* 881!

Transvaal. Soutpansberg, *Pole Evans* 3762!

J. B. Gillett

The derivation of the generic name Dicraurus Hook.f. (Amaranthaceae).—This strangely sounding name has caused some perplexity to workers in the past. Hooker himself gave no explanation of its meaning. Post & Kuntze, in their 'Lexicon Generum Phanerogamarum', 172 (1903), altered it to *Dicrurus*. Schinz, in his treatment of the *Amaranthaceae* in Engler & Harms, Nat. Pflanzenfam., ed. 2, **16c**, 77 (1934), wrote: 'Offenbar abgeleitet von δίκραιος (zweispaltig) und οὐρά (Schwanz); wegen des zweispaltigen Griffels?' It was doubtless on the assumption of such a derivation that Post & Kuntze made their alteration, although it should then rather have been 'Dicraeurus'.

In the Kew Herbarium there are two sheets of the type collection (*Wright* 589), both annotated by J. D. Hooker. On one sheet, which bears a number of pencil drawings of his dissections, the name is written '*Dicraurus leptocladus* H.f.', as published; but the word *Dicraurus*, especially in its middle portion (*-rau-*), clearly incorporates an alteration, made possibly by Hooker himself, or perhaps by a later hand, from something else which it is difficult to make out. On the second sheet, however, the generic name is written quite clearly, again in Hooker's hand, as **Dicrairus.** This immediately indicates the derivation from the Greek word δίκραιρος, 'two-horned', or 'forked', evidently referring to the two divaricate and recurved styles, which Hooker, in his drawings, has somewhat emphasized by darkening.

On the reasons for the curious change from the straightforward *Dicrairus* to the apparently meaningless '*Dicraurus*', one can only speculate. The following possibilities may be suggested. (1) The name *Dicrairus* having originally been somewhat lightly pencilled on one of the type sheets, Hooker may have sought—possibly by failing light or with failing eyesight—to make it clearer, and may have inadvertently added an extra upright stroke. (2) The name was mistakenly set by a compositor as '*Dicraurus*', and this was overlooked by the authors during the passing of proofs of the 'Genera Plantarum'. (3) The name having been published in the Genera as '*Dicraurus*' a later botanist may have altered the pencilled 'Dicrairus' on one of the type sheets in order to conform with this.

There would thus seem to be no doubt that this is a case of a 'clearly unintentional orthographic error', for Hooker was not a botanist given to the coining of arbitrarily formed names, and in the revised edition of Willis's 'Dictionary of Flowering Plants and Ferns', now in preparation, it is proposed to adopt Hooker's original spelling.

H. K. Airy Shaw

Notes from the East African Herbarium: XI*

B. VERDCOURT (EAST AFRICAN HERBARIUM, NAIROBI)

ANNONACEAE

Uvariopsis congensis *Robyns & Ghesquière* in Ann. Soc. Sci. Brux. B **53**, 317 (1933)

Uvariopsis sp. nov.; Indigenous Trees of Uganda, ed. 2, 22 (1952)

The fact that the West African and Congo Forest floras extend into Uganda, the Lake Province of Tanganyika and West Kenya is now so well appreciated as to almost preclude mentioning it. The genus *Uvariopsis* has about a dozen species in the Guineean Forest Province. One species is widespread in Uganda and I recently found it in Kakamega Forest, Kenya. The phrase 'leaf-base cordate' given in the 'Indigenous Trees of Uganda' is a slip.

UGANDA. Bunyoro District: Budongo Forest, 1939, *Lindemann* 534 (EA, K):—shrub or small tree; same locality, 1080 m., Nov. 1932, *C. M. Harris* 167 *in F.D.* 1127 (EA, ENT, K):—small tree with straight bole up to 7·5 m.; girth at breast-height 0·67 m. (wood specimen 113); same locality, Nov. 1935, *Eggeling* 2291 (EA, K):—petals 4, yellow-pink, fleshy; same locality, 1080 m., June 1937, *Eggeling* 3357 (ENT, K): undergrowth shrub or small tree; fruits red (carp. coll.); same locality, 1125 m., Jan. 1940, *Eggeling* 3858 (ENT):—tree. Toro District: Kibale, Aug. 1936, *Eggeling* 3154 (ENT, K):—understorey tree to 6 m. tall; flowers yellow. Mengo District: Mabira Forest, Dec. 1946, *Kigundu* 43/93 (ENT):—tree 9–10·5 m.; girth 0·6–0·9 m.; crown small, lightly spreading; bole not very straight, single; bark grey-green with brown patches; slash soft, creamy to orange; same locality, Nov. 1947, *Cahusac & Philip* 68 (ENT):—tree of understorey up to 18 m. [sic]; crown dense and deep; bole of good form; bark smooth, hard, brown with grey patches; fissures causing elongated oblong vertical markings; slash light brown surrounded by a black ring plus vertical white striations.

KENYA. N. Kavirondo District: Kakamega Forest, in secondary forest by roadside leading to Yala River from junction of main road with road leading to forest house, c. 2000 m., 10 Dec. 1956, *Verdcourt* 1695 (BR, EA, K, PRE, UTAH): small tree with deep green foliage, cauliflorous or with flowers on leafy shoots; flowers cream-coloured, greenish outside; carpels and anthers green.

Ophrypetalum odoratum *Diels* in Notizbl. Bot. Gart. Berlin **13**, 270, fig. 91 (1936).

Diels described this from a leafless specimen, *Schlieben* 5670, found by Lake Lutamba in the Lindi District of Tanganyika. Dr. Eggeling collected a few buds off a leafless shrub at the type-locality but no leaf-material has been seen from this area. Leaf-material has, however, been collected in Kenya, which appears to be conspecific. The flowers of this genus are very characteristic. The buds have raised ridges along the joins of the sepals. The inner petals consist of a broad crenulate limb with a long narrow claw and at the junction of the two there is a dense brush of stout hair-like appendages. The function of this is obscure but since these brushes are in contact with the stamen mass in the buds they may serve some function in connection with pollination.

A description of leaves and fruits may now be given.

Leaves glabrous, elliptic, obovate or narrowly obovate-elliptic, 2·8–9·8 cm. long and 1·3–5·5 cm. broad, rounded, subacute or very obscurely and obtusely acuminate at the apex, rounded or more rarely cuneate at the base, green above, paler, rather glaucous beneath; petiole short, about

* Continued from Kew Bull. **14**, 342 (1960)

5 mm. long; lateral nerves ± 13, tertiary venation delicately reticulate, prominent on both sides. The pedicels are sheathed at the base by a series of minute pubescent bracts which, in their very young stage before the flower has developed at all, are strongly reminiscent of an *Eragrostis* spikelet. The leaf-buds are also similar. *Monocarps* (from *Napier* 3345, in a packet detached but I see no reason to doubt their association with the sheet, although such doubts have been expressed on the sheet at Kew) ± 8, fusiform, shortly stipitate at the base, subacute at the apex, velvety brown pubescent, strongly ribbed longitudinally but this may be an artefact due to drying, 5 cm. long and 1 cm. wide.

KENYA. Kilifi District: Vipingo, 32 km. N. of Mombasa, common in coastal woodland on coral with *Scorodophloeus*, *Grandidiera*, *Manilkara*, *Craibia*, *Rinorea* etc., 30 m., 17 Dec. 1953, *Verdcourt* 1075 (EA, K, PRE):—shrub or small tree to 3 m. tall; bark grey, little fissured; leaves pale glaucous below; buds greenish with dense brown tomentum; petals joined at base, brownish, a long claw with distal part a broad crenulate portion, the three inner petals with a brown "brush' just below this crenulate portion; flowers on branches up to 2·5 cm. in diameter. Kwale District: Diani (Kiwi), in forest belt which runs right down to the sea, 1 June 1934, *Napier* 3345 (EA, K):—an undershrub; flowers borne sessile on branches and on main trunk.

TANGANYIKA. Kiserawe District: Vikindu Forest Reserve, Aug. 1953, *Paulo* 139 (EA, K). Lindi District: in parched gully leading down to Lake Lutamba, 255 m., Nov. 1953, *Eggeling* 6728 (EA):—small leafless tree 2·4 mm. tall.

The figure given by Diels shows the flowers aggregated but the description says that they can also be solitary. The Kenya sheets show solitary flowers and the two Tanganyika sheets have the buds detached. This character is a very variable one in the family. *Paulo* 139, which is only in bud, appears to be somewhat intermediate with the following subspecies.

Ophrypetalum odoratum *Diels* subsp. **longipedicellatum** *Verdc.*, subsp. nov. a planta typica floribus paulo minoribus, solitariis vel fasciculatis, pedicellis 15–22 mm. non 3–4 (–7) mm. longis, foliis obovatis vel lanceolato-obovatis, apice acutis, acuminatis vel obtusis, basi rotundatis vel anguste cuneatis, 4–12 cm. longis et 1·7–5·0 cm. latis, differt.

TANGANYIKA. Morogoro District: Kimboza Forest Reserve, in swamp-forest, July 1952, *Semsei* 770 (EA, holotype, K, isotype):—small tree to 9 m. ['sic'], used for hut building; 38 km. E. of Morogoro on main road to Dar es Salaam, in thin patch of riverine thicket on slopes of steep, rocky gorge in *Brachystegia–Julbernardia* grassed woodland, 450 m., 7 Nov. 1956, *Welch* 332 (EA, K):—semi-scandent shrub 2·5 m. tall, leafless at this time; bark grey-brown, smooth; older bark flaking slightly; flowers pale yellowish-brown; same locality, 4 March 1957, *Welch* 332a (EA, K):—specimen in leaf from same population.

COMPOSITAE

In 'Notes from the East African Herbarium: VIII' (Kew Bull. **13**, 220: 1958) I used the name *Phyllactinia grantii* Benth. ex Oliv. Mr. A. A. Bullock has kindly pointed out to me that the generic name *Phyllactinia* Benth. (1873) is a later homonym of *Phyllactinia* Léveillé (1851), which is a genus of *Fungi*. There is an available name which must be used, namely *Pasaccardoa* Kuntze (Rev. Gen. **1**, 354: 1891) and the plant should be known as **Pasaccardoa grantii** (*Benth. ex Oliv.*) *Kuntze*.

MELIACEAE

Trichilia rubescens *Oliv.* in Fl. Trop. Afr. **1**, 336 (1868); Fl. W. Trop. Afr., ed. 2, **1**, 704 (1958)

This tree which is well-known from the forests of southern Uganda also occurs in the Bukoba District of Tanganyika but was omitted from the Tanganyika Check List. It is recorded from Tanganyika by Keay (in Fl. W. Trop. Afr., *l.c.*) presumably on the basis of the following sheet.

TANGANYIKA. Bukoba District: Kiamawa, in forest, on alluvial, red chocolate loam, Oct. 1935, *Gillman* 407 (EA, K):—medium tree.

MENISPERMACEAE

Cocculus pendulus (*J. R. & G. Forst.*) *Diels* in Engl., Pflanzenr. IV. **94**, 237, fig. 78 (1910); Troupin in Fl. Trop. E. Afr., Menispermaceae 10 (1956)

The following record is the second for Kenya and the first for the Northern Frontier Province. The previous record was from Turkana.

KENYA. Northern Frontier Province: foot of Mt. Kulal in dry bushland, July 1958, *Verdcourt in E.A.H.* 11692 (EA).

AÏZOACEAE

Limeum arabicum *Friedrich* in Mitt. Bot. Staats. München **14–15**, 156 (1956).

A further specimen of this plant may be recorded. I have compared the sheet with an isotype (*Popov, Tillin & Gilliland* 4195) preserved in the East African Herbarium.

ARABIA. East Aden Protectorate: Rub-al-Khali, Camp 1, 17° 30′ N., 48° 30′ E., *R. J. V. Joyce in E.A.H.* 11488 (EA).

RUBIACEAE

Uncaria africana *G. Don*, Gen. Syst. **3**, 471 (1834)

This genus has not hitherto been recorded from Tanganyika but it was to be expected since it was known to occur in Uganda in a piece of forest cut by the border.

TANGANYIKA. Bukoba District: Minziro Forest, growing by paths, 1140 m., 6 March 1957, *Willan* 302 (EA, K):—sprawling shrub with thorns from ribbed stems and round inflorescences; same locality, 1170 m. 18 Aug. 1954, *Willan* 160 (EA, K):—sprawling scandent shrub to 4·5 m., abundant in exploitation gaps in high forest; Kihaya name 'Ruyagya'; same locality, in open parts of dense semi-swamp evergreen forest, Sept. 1950, *Watkins* 533 *in F.D.* 3272 (EA, K):—scandent spiny shrub; Kihaya name 'Chigoyagoye'. Ulanga District: Ifakara, July 1959, *Haerdi* 289/0 (EA, K).

E. Petit (Bull. Jard. Bot. Brux. **27**, 442: 1957) has recently divided this species into a number of varieties. In his key (which does not mention the typical variety) the Bukoba plant runs down to var. *angolensis* Haviland but is not that variety since Haviland characterises it by its pedicellate flowers which in the Bukoba plant are ± sessile (fruiting Uganda examples have long pedicels). Hutchinson & Dalziel treat this variety as a separate species *U. angolensis* (Haviland) Hutch. & Dalz. and also mention pedicellate flowers. They give the size of the inflorescence as 6 cm. in diameter which is far greater than our Bukoba examples. The latter are probably best referred to var. *africana* although the calyx-lobes are constantly longer than they are in that variety.

Mussaenda erythrophylla *Schumach. & Thonn.*, Beskr. Guin. Pl. 116 (1827)

This conspicuous climbing shrub has a range stretching from West Africa to Uganda and the Sudan. It occurs in Kakamega Forest in Kenya, a well-known stronghold of plants with West African affinities and is recorded from Bukoba District in Tanganyika as follows:—

Tanganyika. Bukoba District: Ihangiro in rain-forest on alluvial clay, Feb. 1936, *Gillman* 608 (EA):—shrub 3 m. tall; Minziro Forest, in felling gaps etc., 1140 m., Jan. 1958, *Procter* 787 (EA, K):—climber with conspicuous scarlet bracts and cream flowers.

Sabicea orientalis *Wernham*, Mon. Sabicea 34 (1914)

A sheet from Bukoba district (without flowers) matches Usambara material quite well and cannot be distinguished, I feel, from *S. orientalis*.

Tanganyika. Bukoba District: Minziro Forest, in undergrowth of exploited evergreen forest, 1140 m., Feb. 1958, *Procter* 825 (EA):—climber; fruits whitish, yielding pink juice when crushed.

Didymosalpinx norae (*Swynnerton*) *Keay* in Bull. Jard. Bot. Brux. **28**, 64 (1958)

[*Gardenia abbeokutae* sensu Verdc. in Kew Bull. **7**, 360 (1952); Brenan in Check Lists of The Forest Trees and Shrubs of the British Empire **5**, Tanganyika Territory, part 2, 495 (1949), *non* Hiern]

This species may now be recorded for Kenya.

Kenya. Kwale District: Mrima Hill, lowland evergreen rain forest, 190 m., 4 Sept. 1957, *Verdcourt* 1854 (EA, K):—spiny shrub 2·4 m. tall, branched at the base; fruits globose, pale green or white with deep green longitudinal lines.

Tanganyika. Morogoro District: Manyangu, Turiani, Nov. 1953, *Paulo* 192 (EA, K); Mtibwa Forest Reserve, forest edge, Aug. 1952, *Semsei* 897 (EA, K):—small tree to 6 m.; Nguru name 'Kitovutovu'. Lindi District: Rondo Plateau, Mchinjiri, 810 m., Nov. 1951, *Eggeling* 6404 (EA): small spinose, understorey tree to 4·5 m.; flowers white, paired, pendulous; Lake Lutamba, 240 m., 10 Jan. 1935, *Schlieben* 5852 (EA, PRE) (variant with longer sepals).

The forest at Mrima Hill is of great interest. The dominant trees are *Combretum schumannii* Engl., *Lovoa swynnertonii* Bak.f. (named from fallen leaves only, good specimens were unobtainable but are needed for confirmation), *Sterculia appendiculata* K. Schum., *Cola* spp., *Antiaris usambarensis* Engl., and *Newtonia paucijuga* (Harms) Brenan; other conspicuous trees are *Terminalia kilimandscharica* Engl., *Cordyla africana* Lour., *Lannea ?amaniensis* Engl. & Krause (a new record for Kenya if correct but only sterile material was obtainable), *Gigasiphon* sp. (new to Kenya and similar to species in the Usambara Mts. and Rondo Plateau in Tanganyika), *Chlorophora excelsa* (Welw.) Benth. & Hook.f., *Majidea zanguebarica* Oliv., *Uvariodendron* sp. (similar to if not identical with ones in the Uluguru and Usambara Mts.) and *Uvaria* and *Uvariodendron* spp. (identical with species known from coastal forests to the north of Kenya). There are two distinct components in this forest apart from the many widely distributed species. Several of the apparently quite endemic Kenya coastal species are present (e.g. *Uvaria* sp. nov. = *Dale* 3789 & *Verdcourt* 1892, *Drypetes* sp. nov. = *Abdullah* 3857 & *Verdcourt* 1893, *Uvariodendron* sp. = *Dale* 3836). The other component consists of such species as *Didymosalpinx norae* (Swynnerton) Keay which are distributed from Gazaland up through the Rondo Plateau to the Uluguru Mts. and/or Usambara Mts. or have only so far been found in the latter. Quite a number of species were discovered which are apparently new to

Kenya or to science, *Popowia trichocarpa* Engl. & Diels, *Scolopia cf. stuhlmannii* Warb. & Gilg, *Dichapetalum cf. gossweileri* Engl. etc.

Evergreen rain forest is often characterised by distinctive forest-floor herbs of small stature—many of which belong to the *Acanthaceae* or the *Rubiaceae*. One of these plants which is abundant in some areas of the Eastern Usambara Mts. has long remained undescribed.

Psychotria pandurata *Verdc.*, sp. nov. ab omnibus speciebus adhuc descriptis habitu minore, foliis panduratis facile distinguenda.

Herba perennis, circa 15 cm. alta, caulibus basi decumbentibus, apice erectis, costatis flavo-brunneis pubescentibus. *Internodia* 0·5–3·5 cm. longa. *Stipulae* bifidae, lobis scariosis lineari-triangularibus apice attenuatis usque 8 mm. longis divisae. *Folia* petiolata, petiolis 0·5–3 cm. longis pubescentibus, pandurata, oblongo-obovata, ovata vel oblongo-elliptica, apice subacuta, basi cordata, supra glabra, subtus ad nervos breviter pubescentia, margine irregulariter minute undulato-crenulata, 9–10·8 cm. longa, 3·5–4 cm. lata, basi 1–1·5 cm. lata; nervi laterales utrinque 8–10, adscendentes, prope marginem anastomosantes, supra impressi, subtus prominentes. *Flores* albi in inflorescentias subcapitatas, paucifloras, terminales, 6–10 mm. longas et latas dispositi; pedunculus circa 2 cm. longus, pubescens; pedicelli 1–2 mm. longi. *Calycis tubus* pubescens, 2 mm. longus et 0·8 mm. latus, lobis 5 triangularibus 0·5 mm. longis divisus. *Corollae tubus* 3·5 mm. longus, basi 1·2 mm. latus, apice 2·8 mm. latus, extra glaber, intus prope staminum insertionem piloso-annulatus; lobi 5, oblongo-lanceolati, 2·8 mm. longi et 1·5 mm. lati. *Stamina* in tubo inclusa, filamentis brevissimis, antheris 1·1 mm. longis. *Granula pollinis* $\pm$ 40μ diam., zonitriporata, dense reticulata. *Stylus* 2·1 mm. latus; stigmata filiformia, papillata, 1 mm. longa. *Drupa* depresse ellipsoidea, rugulosa, 4·5 mm. alta et 5 mm. lata, medio costata, calyce persistente coronata, bipyrena. *Semina* pyrenis conformia, 3 mm. longa, rugulosa, dorso convexa, facie ventrali leviter concava, albumine haud ruminato.

TANGANYIKA. Usambara Mts.: Kwamkuyu Falls, 17 Jan. 1917, *Zimmerman in A.H.* 7832 (EA) and on steep slope in disturbed forest above the Kwamkuyu River, 450 m., 19 April 1954, *Verdcourt* 1121 (EA, K);—herb to about 15 cm. tall; leaves rather blue-green; fruits green; between Derema and Amani, abundant in some areas near the Kwamkuyu Falls, 840 m., 27 Dec. 1956, *Verdcourt* 1741 (EA, holotype, K, isotype):—small forest-floor herb; leaves glaucous green; corolla white; calyx pale greenish-white.

The leaves are very characteristic in shape, broadest at about one third below the apex, with a narrow subparallel portion below; quite unlike any other *Psychotria* or *Grumilea* I have seen from Africa; nevertheless the plant is scarcely generically distinct. The plant tissues contain raphides and these are particularly numerous between the pyrenes.

Some years ago material of a curious Rubiaceous tree was collected in the Uluguru Mountains. I annotated this as a new species of *Craterispermum* and drew up a description. Publication was however delayed, because it was thought that without a revision of the entire genus it would be unwise to describe a casual new species. The opportunity for this revision has not been found but sufficient material has been examined to ensure that the Uluguru species is indeed new and it is described below.

Disregard of the possible occurrence of heterostyly has led to confusion in many genera. Hiern (Fl. Trop. Afr. **3**, 160: 1877) uses the exsertion of the style or stamens as a main character in his key to the five species of *Crateri-*

spermum then known and Hutchinson & Dalziel (Fl. W. Trop. Afr. **2**, 115: 1931) do the same. G. Taylor appears to have been the first person to have noted heterostyly in the genus (Cat. Vasc. Pl. S. Tomé, 211–212: 1944) and the dismissal of this character means that all the species need re-examining from a different point of view. I have recently shown (Bull. Jard. Bot. Brux. **28**, 240: 1958) that this genus which has for so long been placed in the *Vanguerieae* should actually be placed in a separate tribe in the *Rubioïdeae* near to the *Psychotrieae*.

Craterispermum longepedunculatum *Verdc.*, sp. nov. affinis *C. ledermannii* Krause (e desc.) et *C. inquisitorio* Wernham, inflorescentiis longe pedunculatis non dense spicatis, corollae tubo intus glabro differt.

Arbor parva, glabra, usque 8 m. alta, ramulis parce ramosis viridis laevibus, internodiis 2–3 cm. longis. *Folia* opposita, elliptico-oblonga, 4·5–12 cm. longa et 1·7–4·5 cm. lata, apice acuminata, acumine acuto 6–15 mm. longo, basi cuneata, supra nitida, viridia, subtus pallidiora, margine minutissime undulata, costa subtus prominenti, supra leviter impressa; nervis lateralibus circa 10, patulis utrinque prominulis, venulis subtus minute reticulatis petioli 7–11 mm. longi, supra canaliculati; stipulae ovato-oblongae, acutae vel obtusae, 4 mm. longae et 3·5 mm. latae. *Inflorescentiae* supraaxillares, 2–4·5 cm. longae, pedunculatae, pedunculis ± complanatis 1·5–2·7 cm. longis, dichotomae vel non ramosae, 1–pluriflorae, bracteis minutis acutis haud congestis 0·5 mm. longis. *Flores* parvi, albi, pentameri. *Calycis tubus* urceolatus, 3 mm. longus et latus, lobis deltoideis acutis 1 mm. longis et latis instructus; discus annularis 0·6 mm. altus et 1·3 mm. diam. *Corollae tubus* 7 mm. longus, basi 1·7–2·2 mm. latus, superne leviter ampliatus, 3·5 mm. latus, utrinque glaber, lobis oblongis 5 mm. longis et 2 mm. latis, apice acutis inflexis (false obtusis). *Stamina* in tubo ampliato inclusa, filamentis brevibus, antheris angustis 2·75 mm. longis. *Stylus* 6·5 mm. longus; stigma bifidum, lobis oblongis 2 mm. longis divisum. *Ovarium* 2-loculare, ovulis solitariis pendulis. *Fructus* immaturus urceolato-globosus, apice attenuatus, 6·5 mm. longus et 5·5 mm. latus, calyce persistente 2 mm. longa coronatus.

Tanganyika. Morogoro District: Nguru Mts., Turiani, Koluhamba, forest edge, April 1953, *Semsei* 1153 (EA, holotype, K, isotype):—common small tree up to 7·5 m. tall; flowers white; same locality, Nov. 1953, *Semsei* 1443 (EA, K):—common tall slender straight tree; S. Nguru Mts., Ruhamba Peak, in second-storey tree layer in lower hillside forest, 1200 m., 2 April 1953, *Drummond & Hemsley* 1993 (EA, K):—small tree to 8 m.; bark greyish, smooth; leaves glossy green above, pale green beneath; calyx pale green; corolla and stamens white.

The flowers are probably heterostylous but only ♀ exserted have been seen. Raphides are fairly abundant in the young stems and leaves and this character together with the shape of the style make it certain that the genus should be placed in the *Rubioïdeae*. The inflorescence arises about 4 mm. above the nodes and varies from a solitary flower or simple 3-flowered dichasium to a dichotomous inflorescence of two 'false spikes' borne on the common peduncle.

Pentas caffensis *Chiov.* in Atti R. Accad. Ital., Mem. Cl. Sc. Fis. Mat. Nat. **11**, 33 (1940); Verdc. in Bull. Jard. Bot. Brux. **23**, 315 (1953)

This species was previously known only from the type-specimen (*Pajella* 275, FI). The collection of this plant by Dr. H. F. Mooney in a locality well to the east of the type-locality is therefore worth recording. His specimens

show that the corolla-length can be considerably greater than previously thought and consequently my original key needs altering slightly. The corolla-tube, 4–6·5 cm. long in Pajella's specimen, is 5–9·5 cm. in Mooney's. The characteristic style-indumentum is almost constant but several flowers were found in which the style lacked or almost lacked the long bristly hairs which are usually intermixed with the short emergences. The calyx- and corolla-lobes are confirmed as being 5–7 in number, an odd feature of this species. The leaves attain 9·5 cm. in length and 5 cm. in breadth. All specimens had the style exserted and I doubt if this species is dimorphic.

ETHIOPIA. Sidamo: Seralatto, 6° 0′ N., 38° 10′ E., on steep stony slope on volcanic rock in scrub, 1695 m., *Mooney* 7304 (EA, K):—tall herb with white flowers.

Pentas geophila *Verdc.* in Bull. Jard. Bot. Brux. **23**, 293 (1953)

During a recent trip to southern Tanganyika, Miss D. M. Napper rediscovered this *Pentas*, previously known only from a single specimen. The plants are up to 22 cm. tall, with obtuse leaves, 4·5 cm. long and 1·5 cm. wide; the corolla attains 13 cm. in length with large lobes 1·4 cm. long and 6 mm. wide.

TANGANYIKA. Southern Highland Province: between Mt. Rungwe and the Poroto Mts., in burnt grassland, 29 Nov. 1958, *Napper* 1142 (EA, K):—white-flowered perennial herb up to 15 cm. tall, excluding flowers.

Pentanisia prunelloïdes (*Eckl. & Zeyh.*) *Walp.*

subsp. **latifolia** (*Hochst.*) *Verdc.* in Bull. Jard. Bot. Brux. **22**, 250 (1952)

The evidence for the presence of this species in southern Tanganyika previously rested on a single specimen collected by Mr. A. A Bullock. A further gathering has now been collected.

TANGANYIKA. Ufipa Plateau: about 12 km. N. of Sumbawanga, in savannah, 26 Nov. 1958, *Napper* 1117 (EA, K):—deep blue flowered, perennial, semi-erect herb, 15–20 cm. tall.

Pentanisia longituba (*Franch.*) *Oliv* in F. L. James, Unknown horn of Africa, App. 319 (1888); *Verdc.* in Bull. Jard. Bot. Brux. **22**, 277 (1952)

At the time I published my monograph on this genus (*l.c.*) no material of this species had been seen from Kenya. Two specimens may now be cited.

KENYA. Northern Frontier Province: Marsabit, 1050 m., June 1959, *T. Adamson* 16 (EA, K):—woody plant up to 60 m. tall, flowers light blue; & Furroli, common, 960 m., 12 Sept. 1952, *Gillett* 13806 (EA, K):—40 cm. tall, corolla white faintly tinged with lilac.

Five species of this genus are now recorded at Kenya.

Otiophora stolzii (*Verdc.*) *Verdc.*, sp. et comb. nov., affinis *O. parviflora* Verdc. sed capsulis elongato-ellipsoideis in racemis brevibus 1–3 cm. longis dispositis differt.

O. parviflora Verdc. var. *stolzii* Verdc. in Journ. Linn. Soc. Bot. **53**, 407 (1950); Verdc. in Bull. Jard. Bot. Brux. **23**, 63 (1953).

As already mentioned this plant is worthy of specific rank. The following gathering (*Eggeling* 6611) shows ripe capsules 2·2 × 1·5 mm., similar to those of *O. scabra* Zucc. The seeds are oblong, brown, 1·9 × 1·1 mm., quite different from the subglobose seeds of *O. parviflora* Verdc.

TANGANYIKA. Njombe District: Elton Plateau, 2520 m., May 1953, *Eggeling* 6611 (EA, K): —small tufted herb c. 15 cm. tall, flowers pinkish; Madehani, *Stolz* 2467 (K, holotype, EA, isotype). Rungwe District: Bundali, *Stolz* 2574 (EA, K) (details of these two latter sheets are given in my original paper).

With regard to the affinities of *O. stolzii* it obviously is closely related to the group of species with a caespitose habit but nearer to *O. scabra* than to any of the rest of them. If reference is made to Fig. 2 on p. 387 of my original paper it will be seen that such a species confirms my ideas of the possible relationships of the species.

An Argentine Encyclopaedia.*—This is the first volume of a gigantic undertaking designed to deal with every kind of plant known in cultivation in Argentina. Thus not only garden plants, but also cereal crop species, fodder and industrial plants, forester's trees, vegetables and fruit-bearing species, all come within its scope. The present volume is descriptive and resembles a flora, with generic and specific 'indented' keys and elaborate descriptions. No less than 2780 species are treated, the families being in the order of Engler and Prantl. The general editor is Professor Parodi, who has himself written the two introductory chapters and prepared the key to the families. He has six collaborators, headed by Professor Arturo Burkart. Most of the pleasing drawings have been made from living material by Señor Higinio Lona. Each specific description ends with notes on distribution, uses and methods of reproduction or propagation. Obviously, this admirable work will be most useful to us here.

The preliminary explanatory remarks open with an exemplary, urbane attitude to nomenclature, with no demands for conservation. Less happy and successful, perhaps, is the treatment of common names: 'certain species [reviewer's translation] are known by names from other languages; English: *raigras* . . . . . '. Would any Englishman recognise this at sight? The descriptive text and index increase the mystery with Ray Gras. This is '*castellanizar*' phonetically with a vengeance: the plant concerned is *Lolium perenne* (Rye-Grass). The aim is, no doubt, correct pronunciation.

The second volume of the encyclopaedia will describe the natural regions, climate and soils of Argentina, and a series of chapters will deal with the cultivation of the various types of economic plants and the pests which attack them. There will be concluding chapters on practical and artistic matters such as tools and the laying out of parks and gardens.

N. Y. SANDWITH

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* *Enciclopedia Argentina de Agricultura y Jardineria.* Directed by Lorenzo R. Parodi. Vol. 1, Descripción de las Plantas Cultivadas. Pp. xv + 931, 252 figures, coloured frontispiece. Buenos Aires: Editorial Acme S.A.C.I., 1959. Price $28.50.

Notes on Malaysian *Euphorbiaceae**

H. K. Airy Shaw

The following series of notes embodies some of the results of an incursion into the *Euphorbiaceae* commenced during the last war and continued over the past two years. For the most part, only some of the smaller and less-known genera are touched on. At a later date it may be possible to attempt revisions of certain of the larger genera. For convenience of reference, the notes are arranged according to the sequence of genera adopted by Pax & Hoffmann in Engler & Harms, Nat. Pflanzenfam., ed. 2, **19c** (1931), and the relevant numbers are given in brackets after the title of each note. In the case of reductions or transferences, it is the more correct position which is indicated by the number given.

I desire to express my sincere thanks to the Directors of the Leiden and Paris Herbaria for the kind loan of type material under their charge.

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II. THE IDENTITY OF THE GENUS GATNAIA GAGNEP.

(P. & H. 14)

The monotypic genus *Gatnaia* was established by Gagnepain (in Bull. Soc. Bot. France **71**, 870: 1924) for a small Euphorbiaceous tree originating in Annam. Its biovulate ovary-loculi indicated it as a member of the subfamily *Phyllanthoïdeae*; but, by a strange slip, the author, after correctly describing the ♂ sepals as 'leviter imbricata', went on to remark in his

* Continued from Kew Bull. **3**, 484 (1949).

discussion: 'Les sépales de ce genre étant valvaires [!], il ne peut appartenir aux *Phyllantheae* . . . c'est parmi les *Bridelieae* qu'il faut le ranger . . . Il semble, en réalité, qu'il faille créer, pour ce genre étrange, une nouvelle section [?!], auprès des *Bridelieae*.' In his treatment in the Flora, however, he inserted several genera (e.g. *Antidesma* and *Andrachne*) between *Gatnaia* and *Bridelia*.

Examination of the type-material, by courtesy of the Director of the Paris Herbarium, reveals that *Gatnaia annamica* Gagnep. is, in fact, a quite typical species of *Baccaurea* (Sect. *Pierardia*), and probably conspecific with Gagnepain's own *Baccaurea oxycarpa*, described only a year before *Gatnaia*! Pax and Hoffmann (*l.c. infra*) placed *Gatnaia* next to *Baccaurea*, but—probably through not examining material—failed to recognise the generic identity.

Judging by the fruits (almost the only part of the plant giving reliable specific distinctions in the difficult Section *Pierardia*), the alliance of *B. oxycarpa* Gagnep. is with *B. wrayi* King ex Hook. f., from the Malay Peninsula, the fruits being rather large, smooth and ovoid in both. In *B. oxycarpa*, however, the ♀ inflorescences and infructescences are borne amongst the leaves on the young twigs, whereas in *B. wrayi*, according to the field-notes of King's collector, Kunstler, they are always borne low down on the main trunk. Gagnepain compared his species with *B. sarawakensis* Pax & Hoffm., but the fruits in that are angled, and the leaves have a rather distinctively smooth appearance. The synonymy and distribution are as follows.

Baccaurea (§ **Pierardia**) **oxycarpa** *Gagnep.* in Bull. Soc. Bot. France **70**, 431 (1923) et in Lecomte, Fl. Gén. Indoch. **5**, 549, fig. 69 (1927).

Gatnaia annamica Gagnep. *ll. cc.* **71**, 870 (1924) et **5**, 540, figs. 66, 67 (1927); Pax & Hoffm. in Engl. & Harms, Pflanzenfam., ed. 2, **19c**, 50 (1931).

Indo-China. Annam (*Eberhardt* 3042! 3043! *Poilane* 11175! *J. & M. S. Clemens* 4354!). Cambodia (*Pierre* 614!).

III. A NOTEWORTHY NEW SPECIES OF SAUROPUS BL. FROM BORNEO

(P. & H. 43)

Sauropus (Sect. *Schizanthi*) **micrasterias** *Airy Shaw*, sp. nov., *S. thorelii* Beille et *S. racemoso* Beille forsan affinis, sed ab illo foliis multo majoribus, inflorescentiis usque 9 cm. longis, ab hoc foliis prominenter reticulato-nervosis, ab utroque tepalis florum ♂ anguste lineari-subulatis fere ad basin usque liberis longe distincta.

Suffrutex parvus, 0·5–0·75 m. altus, vel arbor parva. *Caules* teretes, usque 5 mm. crassi, teste collectore e radicibus longis (? rhizomatibus) exorti, cortice griseo; ramuli juniores graciles, 1 mm. diametro, saepe compresso-angulati, virides, glabri. *Folia* elliptica vel oblongo-elliptica, 10–17 cm. longa, 4·5–7·5 cm. lata, basi cuneata, apice breviter (1–2 cm.) caudato-acuminata, acumine apice obtuso, integra, glabra, membranacea, siccitate viridia, costa gracili utrinque prominula vel supra subplana, nervis lateralibus primariis gracillimis 10–12-jugis late patulis et procurvis (basalibus anguste adscendentibus subrectis), nervis secundariis gracillimis sed con-

spicue et pulchre reticulatis et subtus manifeste elevatis (pro genere *Sauropode* insolito!); petiolus brevissimus, 2–4 mm. longus, 1–1·5 mm. crassus, interdum subcarinatus, supra canaliculatus, glaber; stipulae subulatae, 2–3 mm. longae. *Inflorescentiae* cauliflorae, racemosae, solitariae vel binae fasciculatae, 3–9 cm. longae, flores ♂ et ♀ gerentes, rhachi gracili simplici minute papilloso-puberula, floribus e nodulis bracteolatis fasciculatim exortis, bracteis subulatis 1 mm. longis, bracteolis minutissimis. *Flos* ♂: pedicellus filiformis, 5–12 mm. longus, sparse minute papillosus vel subglaber; tepala lineari-subulata, 3–3·5 mm. longa, basi brevissime connata et vix 1 mm. lata, supra (facie interiore) minutissime papillosa et leviter carinata, dorso fere laevia, apice acuta, teste lectoribus rubido-punicea, disci lobis (vel 'glandulis') parvis rotundatis inflexis velut labium superius excavationis basalis tepalorum efformantibus; columna staminalis brevissima, subpeltata, triangularis. *Flos* ♀: pedicellus crassus, abbreviatus, 2–3 mm. longus, papillosus; perianthium turbinatum; tepala obovata vel elliptica, 3–4 mm. longa, 1·5–2 mm. lata, apice obtusa vel rotundata, inferne suberecta, superne patentia; ovarium subglobosum, 2 mm. diametro, 6-lobulatum; styli breves, bicrures, cruribus recurvo-divaricati. *Fructus* ignotus.

Sarawak. Bidi Caves, rocky forest above caves, 18 Oct. 1929, *J. & M. S. Clemens* 20649: 'Small tree or shrub; inflorescence cauline; flower red-pink'. 1st Division, rock formation (Bau series) W. and E. of passage of Sungei Serin (30 miles S. of Kuching, approx. 1° 10′ N., 110° 20′ E.), primary forest on limestone, 100–300 m., 12 Aug. 1958, *M. Jacobs* 5179 (typus, Herb. Kew.; dupl. in Herb. Lugd.-Bat.): 'Terrestrial, 0·5–0·75 m., sprouting from long roots. Flowers dull raspberry-red, anthers 3, cream-coloured'.

This interesting species, which is clearly referable to Pax & Hoffmann's section *Schizanthi*, seems not to be closely related to any one hitherto known species of the section, but rather to combine certain features of several.

The only other species with a truly cauliflorous and racemose inflorescence appears to be *Sauropus racemosus* Beille (Tonkin), but that has very broad emarginate perianth-segments, longer inflorescences, and longer bracts and bracteoles, besides the thinly herbaceous leaves that are customary in the great majority of species of the genus. The only species in which the texture and nervation of the leaves are really comparable with those of the present one is *S. thorelii* Beille (Laos and Siam), but in that the leaves are very much smaller (4·5–11 × 1·2–1·8 cm.), and the inflorescence is extremely abbreviated, practically fasciculate. The perianth-segments of the ♂ flowers are apparently much narrower than in any other known species, the nearest approach being perhaps found in *S. trinervius* Muell. Arg. (Sikkim and Assam), but this species again has leaves of typical *Sauropus* texture, and the trinerved venation is very different and distinctive.

It may be noted that the inflexed disc-lobes above the base of each perianth-segment in *S. micrasterias* apparently by no means meet or overlap, as in the majority of species of *Sauropus*, but leave the centre of the flower wide open.

The specific epithet has been given because of the resemblance of the ♂ flowers to minute starfish.

IV. THE GENUS CHORICERAS BAILL. IN NEW GUINEA

(P. & H. 53/a)

In the seventh volume of 'Adansonia' (1867) Baillon proposed the genus *Dissiliaria* F. Muell. (MS.) for two woody Australian *Euphorbiaceae*, with opposite leaves, which he stated were closely related to the New Caledonian genus *Longetia*. In the seventh volume of the 'Flora Australiensis' (1873) Bentham described a third species (*D. tricornis* Benth.), adding however to his generic description the note that, owing to the incompleteness of the available material, 'the three species may not . . . be strictly congeners' (*l.c.* 90).

Later in the same year (1873), Baillon, in the eleventh volume of 'Adansonia' proposed the genus *Choriceras*, with the single species *Ch. australianum* Baill., for 'une Euphorbiacée à feuilles opposées, comme celles de *Dissiliaria*' (*l.c.* 118), but possessing the unusual character for *Euphorbiaceae* of carpels free for half their length.

It has since been found that *Dissiliaria tricornis* Benth. and *Choriceras australianum* Baill. are conspecific, and Baillon's genus has thus come to be regarded as synonymous with *Dissiliaria*: see Pax & K. Hoffmann in Engler, 'Pflanzenreich' IV. **147**, xv, 291 (1922), and in Engler & Harms, 'Pflanzenfamilien', ed. 2, **19c**, 76 (1931).

Having recently had occasion to examine the New Guinea specimens, cited below, which I believe to be referable to this species, I am of the opinion that Baillon's genus *Choriceras* should be maintained. If *Dissiliaria* be typified (as it presumably should be) by *D. baloghioïdes* F. Muell. ex Baill., then *Choriceras* differs in its crenulate, somewhat box-like leaves, monoecious flowers and bisexual inflorescences, minute male flowers on almost capillary pedicels, female flowers with half-free carpels drawn out into long styles with uncinate stigmas, and tridymous tricornute capsules.—Whether the imperfectly known *Dissiliaria muelleri* Baill., which has crenulate leaves but apparently a very different inflorescence (see Baillon, Adans. **7**, t. 1), should also be referred to *Choriceras*, can only be decided when complete flowering material becomes available.

Choriceras *Baillon*, Adansonia **11**, 119 (1873), Hist. Pl. **5**, 145 (*in adnot.*), 240 (1874); Dict. Bot. **10**, 28 (1886).

Choriceras tricorne (*Benth.*) *Airy Shaw*, comb. nov.

Dissiliaria tricornis Benth., Fl. Austr. **6**, 91 (1873); Bailey, Syn. Queensl. Fl. 470 (1883); Queensl. Fl. **5**, 1430 (1902); Compreh. Cat. Queensl. Pl. 477 (1913); Ewart & Davies, Fl. North. Terr. 167 (1917); Pax & Hoffm. in Engl., Pflanzenr. IV. **147**, xv, 292 (1922); Specht in Specht & Mountford (ed.), Rec. Amer.-Austral. Sci. Exped. Arnhem Land **3**, 461 (1958).
Choriceras australiana [sic] Baill., *ll.cc.*

Papua. Wuroi, Oriomo River (Lower Fly River), Western Division, several trees in a small forest clump on savannah, 30 m. alt., Jan.-March 1934, *Brass* 5755: 'Slender tree 5–7 m.; leaves smooth and shining; nerves pale above; 3-celled dehiscent fruit.'

Dutch New Guinea. Merauke District: Bivak Animanhazin, forest, 5 m. alt., 4 Aug. 1941, *Anta* (*Exped. Wentholt*) 189: 'Fruit light green.'

These two localities are about 150 miles apart, in the large southernmost 'bulge' of New Guinea. The species has hitherto been known from the north coast of the Northern Territory of Australia, and from the east coast of northern Queensland.

The appearance of herbarium specimens of *Choriceras* is remarkably suggestive of *Buxus*. That of *Dissiliaria baloghioïdes*, on the other hand, is, as its name suggests, reminiscent of *Baloghia*, especially of the opposite-leaved *B. lucida* Endl.; the leaves are also very similar to those of many species of *Drypetes*.

V. ON SUMBAVIA MACROPHYLLA MUELL. ARG.

(P. & H. 71)

In his monographic treatment of the *Euphorbiaceae*, Pax (Engl. Pflanzenr. IV. **147**, vi, 11–14: 1912) recognised two species of *Sumbavia*: *S. rottleroïdes* Baill. and *S. macrophylla* Muell. Arg., and one species of *Sumbaviopsis*: *S. albicans* (Bl.) J. J. Sm. Smith had established the latter genus on account of the usually 10 petals of the ♂ flower and the bifid styles of the ♀. It is not my intention here to argue the pro's and con's of this treatment. J. D. Hooker has already pointed out (Fl. Brit. Ind. **5**, 408: 1887) that *Sumbavia* (*sensu lato*) only differed from *Mallotus* in possessing petals, and the validity of the many *Mallotus* allies and segregates can only be assessed by a re-examination of the entire group. But examination of the material of the above three supposed species preserved at Kew has made it clear that, in fact, only two species are involved, and that *Sumbavia macrophylla* is none other than *Sumbaviopsis albicans*. As this results in a considerable readjustment of the supposed geographical areas of the two genera, it seems worth while putting the facts on record. It has already been pointed out by Merrill (Species Blancoanae, 221: 1918) that the generic name *Sumbavia* Baill. (1858) is antedated by *Doryxylon* Zollinger (1857), and that the correct specific name for this species is *D. spinosum* Zoll. The genus *Doryxylon* being now restricted to this one species, its known distribution is limited to the Philippines, Java, Bima and Sumbawa.

Sumbaviopsis albicans (*Bl.*) *J. J. Sm.* in Meded. Departm. Landb. **10**, 357 (1910); Pax in Engl., Pflanzenr. IV. **147**, vi, 14 (1912) (*q.v.* for further synonymy); Merr., Enum. Phil. Fl. Pl. **2**, 428 (1923); **4**, 93 (1926); Gagnep. in Lecomte, Fl. Gén. Indoch. **5**, 418–420 (1926); Merr., Pl. Elm. Born., in Univ. Calif. Publ. Bot. **15**, 156 (1929); Henderson in Gard. Bull. Str. Settlem. **7**, 125 (1933).

Adisca albicans Bl., Bijdr. 611 (1825–26).

Sumbavia macrophylla Muell. Arg. in Flora, **47**, 482 (1864); Pax, *l.c.* 12 (*q.v.* for further references); Pax & Hoffm. in Engl. & Harms, Nat. Pflanzenfam., ed. 2, **19c**, 89 (1931); Kanjilal, De & Das, Fl. Assam, **4**, 199 (1940); **synon. nov.**

The species is now known from the following areas. Only those records which do not appear to have been hitherto published are given in detail.

Assam. *Sine loc.*, April 1879, *D. Brandis s.n.*—See also Kanjilal *et al.*, *l.c.*

Burma. *Griffith* (type of *S. macrophylla* Muell. Arg.); *Kurz*; *Meebold*; see Pax, *l.c.*, sub *S. macrophylla*. Myitkyina Distr.: Kaukkwè, 240 m., April 1912, *For. Ranger Mg. Kyaw* 88: 'Small tree'.

Siam. Me Song, 180 m., 11 May 1912, *Luang Vanpruk* 292: 'Evergreen tree, 3 ft. girth, smooth dark bark' (var. *disperma* Gagnep.).

Indo-China. *Harmand*; *Poilane* (incl. var. *disperma* Gagnep.); see Gagnepain, *l.c.*

Malay Peninsula. *Henderson*; see Henderson, *l.c.*

Sumatra. Leg.? See Merrill, *l.c.* (1923).

Borneo. Sarawak: Gunong Tieng, near Kuching, 1929, *J. & M.S. Clemens* 20483: 'Sapling shoots from cut trunk.' Central E. Borneo: E. Koetai, 'no. 45', G. Kombeng, on limestone rock in forest, alt. 40 m., 24 Nov. 1925, *Endert* 5213: 'Tree, 15 m. high, 20 cm. diam.; fruit dark brown' (perhaps var. *disperma* Gagnep.). N. Borneo: *Elmer*; see Merrill, *l.c.* (1929).

Philippines. *Elmer*; see Merrill, *l.c.* (1923 & 1926).

Java. *Blume* (type of *Adisca albicans* Bl.), *Zollinger*, *Koorders*, etc.; see J. J. Smith, *l.c.*

VI. THE GENERA CHONDROSTYLIS BOERL. AND KUNSTLERODENDRON RIDL.

(P. & H. 85/a)

The genus *Chondrostylis*, with the single species *Ch. bancana*, was proposed by Boerlage in 1897 (Ic. Bogor. **1** (1), t. 23) for a Euphorbiaceous shrub, originating from the island of Banka, grown in the Botanic Gardens at Buitenzorg. Since only female flowers were known, it was not possible to assign it to a definite place in the family, but the author noted that it had points in common with a number of genera in the subtribe *Acalypheae* of Bentham and Hooker (*Mercurialinae* of Pax), whilst at the same time showing a striking resemblance in vegetative characteristics to the genus *Agrostistachys* Dalz., referred to the *Chrozophoreae*.

A few years afterwards, Koorders noticed that Boerlage's type plant in the Botanic Gardens was again producing abundant female flowers, and setting fruit, and a few days later he found that male flowers were also present. On the basis of this, he published a careful and detailed account of the plant (Ann. Jard. Bot. Buitenz. **19**, 45–56, tt. IV & V: 1904), and discussed its relationship, concluding that it was indeed referable to the subtribe *Mercurialinae*, in the neighbourhood of the American genus *Bernardia* P. Browne. Essentially this position was accepted for *Chondrostylis* by Pax & Hoffmann (Engl., Pflanzenr. IV. **147**, vii, 15: 1914; Pflanzenfam., ed. 2, **19c**, 104: 1931), although it must be confessed that in general appearance there is little, if anything, in common between the two genera.

No authentic material of *Chondrostylis* is present in the Herbarium of the Royal Botanic Gardens, Kew. But, when recently re-examining the material of Ridley's genus *Kunstlerodendron*, from the Malay Peninsula (described from male plants only), I was freshly impressed, as I had been some years previously, with its remarkable similarity in habit to *Agrostistachys*, and I recalled Boerlage's remarks concerning the resemblance of his *Chondrostylis* to that genus. Further investigation and comparison of the types has now

shown that *Kunstlerodendron sublanceolatum* Ridl. and *Chondrostylis bancana* Boerl. are congeneric. The specific epithet employed by Ridley is illegitimate, the species having been based expressly upon *Mallotus ?kunstleri* King ex Hook. f. (Fl. Brit. Ind. **5**, 443: 1887), and a change of both generic and specific name is therefore necessary. (For note on Ridley's second species of *Kunstlerodendron*, *K. cuspidatum* Ridl., see below, p. 361). I am much indebted to the Director of the Leiden Herbarium for the loan of the type of *Chondrostylis bancana* Boerl.

The synonymy and known distribution of the genus and two known species are set out below.

Chondrostylis *Boerlage*, Ic. Bogor. **1**(1), t. 23 (1897); Koorders, in Ann. Jard. Bot. Buitenz. **19**, 45–56, tt. IV & V (1904); Pax & Hoffm. in Engl., Pflanzenr. IV, **147**, VII, 15 (1914), et in Engl. & Harms, Nat. Pflanzenfam., ed. 2, **19c**, 104 (1931).

Kunstlerodendron Ridl., Fl. Mal. Penins. **3**, 283 (1924), *pro parte*; Pax & Hoffm. in Engl. & Harms, *tom. cit.* 230 (1931), *p.p.*

Kunstlera [King ex] Gage in Journ. As. Soc. Beng. **75**, 475 (1936), *in clavi*, *sine descr. lat.*; non *Kunstleria* Prain ex King in *op. cit.* **66**, 109 (1897).

Leaves very large, 40–70 cm. long, 9–17 cm. broad, rather abruptly narrowed into a short stout petiole 1–2 cm. long and 3–10 mm. thick; inflorescences up to 35 cm. long, subsimple . . . . . 1. **bancana**

Leaves much smaller, 15—45 cm. long, 3–15 cm. broad, more gradually narrowed into a long slender petiole 2·5–8 cm. long and 1–2·5 mm. thick; inflorescences 10–25 cm. long, usually much branched . . . . . 2. **kunstleri**

1. **Chondrostylis bancana** *Boerl.*, *l.c.*; Koorders, *l.c.*; Pax & Hoffm., *ll.cc.*

Banka. Without further details, cult. in Hort. Bogor., II.H.8, 1896–1903, *Boerlage*! *Koorders*!

2. **Chondrostylis kunstleri** (*King ex Hook. f.*) *Airy Shaw*, comb. nov.

Mallotus ?kunstleri King ex Hook. f. in Hook. f., Fl. Brit. Ind. **5**, 443 (1887).

Kunstlera glumacea King ex Hook. f., *l.c.*, *in obs.*, *nom. event.*

Kunstlerodendron sublanceolata [sic] Ridl., *l.c. supra*, *nom. illegit.*; Pax & Hoffm. in Engl. & Harms, *tom. cit.* 230 (1931).

Siam. Pattani Circle: Kota Bharu in Rahman, jungle on low hill, 1899, *D. T. Gwynne-Vaughan* 556: 'Tree to 30 ft. [9 m.]. Flowers yellowish-green.' Banang Sta, 6° 17′ N., hill slope, 13 June 1930, *Kiah* 24314: '25–30 ft. [7·5–9 m.] tall. Flower white.'

Kedah. Gunong Inas, 7″m. Reserve, 8 June 1926, *For. Guard Meh* 8997.— Native name: *lidah sapi*.

Perak. Gopeng, Kinta C.P., open jungle, hilly locality, 1500–2400 m., June 1883, *King's Collector* (*Kunstler*) 4252: 'A tall tree 40 to 60 ft. [12–18 m.] high. Stem 6 to 12 in. diam. Leaves a middle green. Flower white.' Sine loc. vel dat., *Scortechini* s.n.

Trengganu. Sungai Paka, 5 July 1931, *Symington* 26809: 'Treelet'. Sri Bangun, near Bukit Besi, 10 July 1953, *J. Sinclair & Kiah bin Salleh* 39882: 'Flowers white'.

KEMAMAN (Trengganu-Pahang border). Ulu Bendong, Kajang, 1500 m., 30 Oct. 1935, *Corner* (Singapore Field No.) 30062 and 30064.

BORNEO. Sarawak, sine loc. vel dat. [*c.* 1911], *Native Collector* 1153; Matang, Jan. 1915, *Ridley s.n.*

All the above material bears male flowers only, except Ridley's specimen from Mt. Matang, which is in fruit. Neither *Chondrostylis* nor *Kunstlerodendron* appears to have been previously recorded from Siam or Borneo.

AFFINITIES

It was evidently the intention of Gage, in his account of the *Euphorbiaceae* for the 'Materials for a Flora of the Malayan Peninsula', No. 26, to describe this plant under the generic name *Kunstlera*, suggested already many years previously by King and referred to by Hooker (as a *nomen eventuale*) in the 'Flora of British India' **5**, 443 (1887). Owing to the first world war, and other circumstances, Gage's account had not appeared in print by the time Ridley's complete 'Flora' was published (1924), but his valuable generic keys (together with a few pages of descriptive text) were eventually published in Journ. As. Soc. Beng. **75** (5), 469 (1936), where the genus *Kunstlera* is mentioned, as No. 47, on pp. 475 and 482. It is placed in the immediate vicinity of *Mallotus* and *Coccoceras*, not only in the general conspectus, but also in the more artificial key to the male plants of dioecious genera.

The female flowers and fruits of *Kunstlera* were unknown to Gage, but in his key to the female plants of dioecious genera they would run down as follows. 'Leaves simple, alternate. Cells of ovary 1-ovuled. Flowers apetalous.' The next alternative concerns the presence or absence of a disk or glands. Boerlage and Koorders attribute to *Chondrostylis* a 'thin, entire, cupular disk, clothing the interior of the calyx, and bearded with simple hairs at the apex.' From Boerlage's figure, however, it would appear to be a somewhat inconspicuous structure. Assuming a disk to be present, the next choice in Gage's key lies between 'Calyx valvate or dentate' and 'Calyx imbricate', which raises difficulties, since Boerlage states: 'Calyx short, campanulate . . . segments imbricate', but his figure gives rather the appearance of valvate segments. In the former case, we are led by the key to: 'Styles present; fruit capsular . . . 56. *Chaetocarpus*'; in the latter case we come, through 'Ovary and fruit usually 3-locular; stigmas subulate', to: 'Fruit sulcately 3-coccate, small, dehiscent . . . 37. *Claoxylon*.'

If it be assumed that no true disk is present, the key leads as follows: 'Leaves not stipellate. Undersurface of leaves neither gland-dotted nor pellucidly punctate. Bracts of inflorescence eglandular or only granularly gland-dotted. Fruit capsular, not large.' The final choice lies between: 'Calyx and ovary tomentose; styles palmately branched . . . 40. *Coelodepas*', and: 'Calyx and ovary glabrous; styles not palmately branched . . . 51. *Cleidion*'; but neither of these alternatives fits *Chondrostylis*, which would require 'Calyx and ovary pubescent; styles not palmately branched.'

It must be confessed that none of the above genera seems very satisfactory as an ally of *Chondrostylis*. The published keys take account almost exclusively of floral characters, and thus ignore what are perhaps the most striking features of this plant, namely its 'Agrostistachyoid' foliage and glumaceous bracts. It is therefore not without interest to find that, by seeking an affinity

for *Chondrostylis* outside the *Acalypheae*, and assuming a *loss of petals*, one is directed to a small group of genera in the *Cluytieae* (Gage), or *Chrozophoreae* (Pax & Hoffmann), in both cases including *Agrostistachys*. In Gage's key, there is difficulty over the question of whether the outer stamens are opposite to or alternate with the sepals: if the latter, one would be led to *Galearia* and *Microdesmis*; but in Pax & Hoffmann's key one comes straight to *Agrostistachys*, *Pseudagrostistachys*, and some African genera, which have either episepalous disk-glands, or (*Pseudagrostistachys*) the whole receptacle glandular-plicate. In *Chondrostylis* there are numerous minute squamiform glands scattered over the receptacle amongst the filaments.

There are, of course, many other differences between *Agrostistachys* and *Chondrostylis*, such as spicate *versus* paniculate inflorescence, versatile *v.* adnate anthers, etc.; nevertheless, in view of the lack of convincing evidence of a close affinity with any genera in the *Acalypheae*, and the striking agreement in the unusual type of leaves and bracts (and, one might also add, the very similar fruits), I believe that these two genera should be associated, in whatever tribe they may be placed. Probably some rather drastic reshuffling will be necessary before a reasonably 'natural' grouping of these genera can be reached.

Kunstlerodendron cuspidatum

Ridley's second species of *Kunstlerodendron*, *K. cuspidatum* Ridl., is not a *Chondrostylis* at all, but is the supposedly 'unknown' male plant of *Mallotus wrayi* King ex Hook. f.! (Fl. Brit. Ind. **5**, 433: 1887; Ridl. Fl. Mal. Penins. **3**, 287: 1924). Pax & Hoffmann had already suggested (*l.c.*, 1931) a relationship of *Kunstlerodendron* with *Mallotus*, perhaps largely on the basis of the characters given for *K. cuspidatum*. It is, I think, clear that Ridley included this species in the genus as a kind of afterthought, since the character given for *Kunstlerodendron* in his generic key (*l.c.* 179) reads: 'Panicles long lax; sepals and bracts glumaceous, glabrous.' This would at once exclude *K. cuspidatum*, which has a ± racemiform inflorescence, not at all glumaceous sepals and bracts, and a minute white stellate tomentum on the sepals.

Ridley states: 'Species 3, Malaya'. I have no idea what he may have regarded as a third species, and think this was probably a slip or a misprint for '2'.

Mallotus wrayi *King ex Hook. f.* in Hook. f., Fl. Brit. Ind. **5**, 433 (1887); Ridl., Fl. Mal. Penins. **3**, 287 (1924).

Kunstlerodendron cuspidata [sic] Ridl., *tom. cit.* 283 (1924), **synon. nov.**

Malay Peninsula. Perak: Larut, open jungle, hilly localities, 90–300 m., Oct. 1882, *King's Collector* (*Kunstler*) 3456: 'A tree 60 to 80 ft. high. Stem 12 to 18 ins. in diam. Leaves bright green with a bluish tinge underneath. Fruit bluish green, not quite ripe.' *Ibid.*, open jungle, hilly localities, 150–300 m., Sept. 1884, *King's Collector* 6628: 'A tree 40 to 60 ft. high, stem 10 to 15 ins. in diam. Leaves light green. Fruit very light greenish grey.' *Ibid.*, dense jungle on high mountains, rocky localities, 600–900 m., Feb. 1885, *King's Collector* 7251: 'A tree 50 to 70 ft. high, stem 10 to 15 ins. in diam. Leaves dark green. Flower [♂!] a waxy delicate white.' *Ibid.*, *Wray*, *teste* Hooker (typus, Herb. Singapore; *non vidi*). Telok Sera, Dindings, Feb. 1896, *Ridley* 7911 [type of *Kunstlerodendron cuspidatum* Ridl.].

Borneo. Sarawak: near Kuching, 25 March 1894, *Haviland & Hose* 3233 K.

Although Hooker makes no mention of the ♂ flowers, and Ridley states: 'Male flowers unknown', young male flowers are actually present on *King's Collector* 7251. The Bornean specimen cited also bears abundant male inflorescences.

VII. THE TAXONOMIC POSITION OF THE GENUS DEUTZIANTHUS GAGNEP.

(P. & H. 95–97)

In proposing the genus *Deutzianthus*, Gagnepain (in Bull. Soc. Bot. France **71**, 139–141: 1924) stated that it belonged to the '*Crotonae* [sic], *Regulares*' —i.e. the *Crotonoïdeae–Chrozophoreae–Regulares*—of Pax & Hoffmann (Engl., Pflanzenr. IV. **147**, VI, 10: 1912; Pflanzenfam., ed. 2, **19c**, 34, 89: 1931), near the American genera *Philyra* Klotzsch and *Ditaxis* Vahl, but that it differed in a number of important points, which he enumerated. He might have added that it differed especially in its general aspect, which is totally and entirely other. He mentioned that Pierre had compared it (in MS.) with the genera *Aleurites* Forst., *Tritaxis* Baill. and *Trigonostemon* Bl., and he himself says that he had sorted it provisionally with *Aleurites* on external appearance. Pax & Hoffmann (1931) accepted it as a genus of the *Chrozophoreae–Regulares* without comment.

Now, although it is true that this plant seems to run down in Pax & Hoffmann's key (Pflanzenfam. *l.c.* 34) to the neighbourhood of the *Chrozophoreae*, this is only because we are faced, at a certain point in the key, with the alternatives: '♂ calyx valvate' and '♂ calyx imbricate'—and the calyx of *Deutzianthus* is certainly not imbricate. The next alternatives (after '♂ calyx valvate') lead directly to *Chrozophoreae*. But the calyx in *Deutzianthus* is one of its most distinctive features: it is cupular, with five short teeth, which are neither valvate nor imbricate, but *open* in aestivation. It was this feature, combined with the large reflexed petals, which led Gagnepain to give it the very appropriate name of *Deutzianthus*, for the resemblance is quite striking. Calyces of this type are very unusual in the *Euphorbiaceae*: for this reason we note with interest that on the next page of Pax & Hoffmann's key (p. 35) there are three genera enumerated under the heading: 'Leaves digitately compound. ♂ *calyx cupular, shortly toothed*'; and a glance at these plants (tribe *Joannesieae*) shows that, in spite of its simple leaves, this is clearly the true affinity of *Deutzianthus*.

The tribe *Joannesieae* was originally established by Pax & Hoffmann (Engl., Pflanzenr. IV. **147**, XIV, 3, 9: 1919; as Subtribe *Joannesiinae*) for the reception of the American genus *Joannesia* and their new genus *Annesijoa*, from New Guinea (*l.c.* 9). The authors remarked that the latter genus was so close to *Joannesia* that when it was better known it might be better to unite the two. A few years later, Pax (in Engl., Bot. Jahrb. **59**, 142, 164: 1924) raised the subtribe to tribal rank, and added to it the genus *Hevea*, formerly included by him in the tribe *Acalypheae*, as sole representative of the subtribe *Heveinae*.

The most striking feature of these three genera lies in their digitate leaves, bearing conspicuous glands at the junction of the petiolules. Now, in *Deutzianthus* the leaves are simple, but they bear (as also in *Aleurites*) a pair of sessile or stipitate discoid glands at the apex of the petiole (cf. illustration in Lecomte, Fl. Gen. Indoch. **5,** 298, fig. 32, 1: 1925). The inflorescences are very similar in general structure, being broad, many-flowered thyrses, with conspicuous elongate bracts and bracteoles; but, whereas those of *Hevea* and *Joannesia* are mixed (♂ and ♀), those of *Deutzianthus* are purely ♂ or ♀, and apparently dioecious. The similarity of the flowers of the latter to those of *Joannesia* is very evident. It is to be noted, however, that in *Deutzianthus* the stamens of the outer whorl are quite free, and that the styles, instead of being simple and terminated each by a large capitate stigma, are twice bifid, with acute tips, the stigmas being punctiform. Unfortunately the fruit is at present unknown*.

It is evident that *Deutzianthus* differs more from the three previously known genera than these do from one another, and also that it shows the least specialised floral structure of the four. The apetalous *Hevea*, with anthers sessile on an elongate androphore, exhibits the greatest specialisation; its calyx-segments also appear to be truly valvate. The following is a modified circumscription of the tribe, with a key to the four genera.

Tribus **Joannesieae** *Pax* in Engl., Bot. Jahrb. **59**, 142 (1924); Pax & Hoffm. in Engl., Pflanzenfam., ed. 2, **19c**, 35, 100 (1931); emend. *Airy Shaw.* —*Folia* digitata, rarius simplicia, petiolo apice biglandulifero. *Inflorescentia* late thyrsoïdea, bracteolis conspicuis linearibus. *Calyx* cupularis, breviter dentatus, dentibus aestivatione apertis vel valvatis. *Petala* suppetentia, rarius 0. *Stamina* in columnam vel fasciculum ± coalita, rarius libera. *Stigmata* expansa vel peltata, rarius punctiformia.

Key to genera

Leaves simple; calyx open; petals present; stamens free; stigmas punctiform . . . . . *Deutzianthus*

Leaves digitate; stamens ± connate; stigmas enlarged:

- Calyx valvate or subvalvate; petals absent . . . . . *Hevea*
- Calyx open; petals present:
  - Stamens ± 20 . . . . . *Annesijoa*
  - Stamens 7–10 . . . . . *Joannesia*

VIII. A SYNOPSIS OF THE GENUS PTYCHOPYXIS MIQ.

(P. & H. 105/107)

Until comparatively recently the small genus *Ptychopyxis* consisted of four species only, limited, so far as was known, to Sumatra and the Malay

* Fruiting specimens have recently come to light, and will be described in a later note.

Peninsula. In 1942, Croizat (Journ. Arn. Arb. **23**, 47–50) more than doubled the number by describing three new ones from Borneo, the Philippines and Annam, and transferring to *Ptychopyxis* the two known species of the genus *Podadenia* Thw. (Ceylon and Java) and the sole species of the obscure genus *Calpigyne* Bl. (Borneo). In the present contribution certain modifications are proposed, and a key to the known species is provided.

Croizat recognises two subgenera of *Ptychopyxis*: Subgen. *Podadenia* (Thw.) Croiz., including *Pt. thwaitesii* (Muell. Arg.) Croiz. and *Pt. caput-medusae* (Hook.f.) Ridl. (the latter designated as type of the subgenus); and Subgen. *Neocalpigyne* Croiz. for the remainder (including *Pt. costata* Miq., the type species of the genus *Ptychopyxis* Miq.), but for this subgenus Croizat designates *Pt. bacciformis* Croiz. as type.

From the point of view of the rules of nomenclature, certain points are in need of adjustment here. The type-species of the Subgenus *Podadenia* (Thw.) Croiz. should evidently coincide with the type-species of the genus *Podadenia* Thw.—viz. *P. thwaitesii* (Baill.) Muell. Arg. (*P. sapida* Thw.). The name of the 'type' subgenus must now (since 1952) repeat the generic name, so that Subgen. *Neocalpigyne* Croiz. becomes simply Subgen. *Ptychopyxis* (without authority); and the type-species will coincide with that of the genus, viz. *Pt. costata* Miq., replacing *Pt. bacciformis* Croiz. Thus:—

Ptychopyxis Miq.

Subgen. Podadenia (Thw.) Croiz.

Typus: *Pt. thwaitesii* (Baill.) Croiz.

Subgen. Ptychopyxis (Subgen. *Neocalpigyne* Croiz.)

Typus: *Pt. costata* Miq.

Subgen. *Podadenia*

Podadenia thwaitesii (Baill.) Muell. Arg. is a very rare tree, endemic, so far as is known, in Ceylon. Whilst not denying its close relationship to *Ptychopyxis*, I myself would be more inclined to maintain it as a distinct genus. Its large, truly terminal, thyrsoid inflorescence, with long, glandular indumentum, and especially the extraordinary covering of large stalked capitate glands on the ovary and fruit*, are really without parallel in *Ptychopyxis*. The anthers, moreover, are bilocular, not quadrilocellate as in *Ptychopyxis*. Croizat associates *Pt. caput-medusae* (Hook.f.) Ridl. with *Pt. thwaitesii* in his Subgen. *Podadenia* because of the dense covering of tomentose processes on the ovary and fruit of the former. But, to my mind, this covering represents a difference of degree, rather than of kind, from the type of covering found in the other species of *Ptychopyxis*. The fruits of *Pt. costata* Miq., the type species, have a system of raised sinuous ridges or folds—longitudinal primaries and transverse or irregular secondaries—whilst in the remaining species the fruits are smooth. All the species, however, possess inflorescences of an essentially similar type, and an essentially similar tomentum on the fruits. The glandular development of *Podadenia* would appear to be something radically different.

* Cf. note by Willis in *Ann. Perad. Bot. Gard.* **5**, 215 (1911).

However, whether one assigns to *Podadenia* generic or subgeneric rank is of relatively little moment. If the latter, the subgenus should be restricted to *Pt. thwaitesii* (Baill.) Muell. Arg., and *Pt. caput-medusae* (Hook.f.) Ridl. should be included in Subgen. *Ptychopyxis*.

Subgen. *PTYCHOPYXIS*

Key to species

Petiole less than 1 cm. long; tertiary nervation distinctly impressed above; fruits covered with longitudinal ridges and transverse or irregular folds (Sumatra, Malay Penins.) 1. **costata**

Petiole exceeding 1 cm. in length; tertiary nervation not impressed above:

Fruits densely covered with long tomentose processes; leaves up to 45 cm. long (Malay Penins.) . . . . . 2. **caput-medusae**

Fruits with 3 short radiating apical ridges, otherwise smooth; leaves up to 21 cm. long (Malay Penins.) . . . . . 3. **triradiata**

Fruits smooth, without ridges or processes (but often rugulose due to shrinking in drying):

Leaves ample, 5–19 cm. wide, broadly obovate, or less frequently oblanceolate:

Ovary bilocular, styles 2; ♀ inflorescences very short (1–1·5 cm.); ♂ inflorescences apparently very variable in length; fruit unknown; leaves drying greenish on both surfaces, otherwise very similar to those of *Pt. arborea* (New Guinea) 7. **chrysantha**

Ovary trilocular; style 3; ♀ inflorescences longer (2–10 cm.):

Leaves very large, 40–55 cm. long; petiole massive, 4–6 mm. thick, with rather loose papery epidermis, apparently quite glabrous (Sarawak) . . . 4. **grandis**

Leaves smaller, up to 36 cm. long; petiole relatively slender, up to 3 mm. thick, epidermis not conspicuously loose or papery, but finely tomentellous, at least when young:

Leaves drying reddish-brown on both surfaces; ♂ inflorescences shorter and stouter, up to 8 cm. long; flowers apparently larger, strongly fulvous-tomentose; fruits larger, globose or ellipsoid, 3–7 cm. long (Malay Penins., Sumatra, Sarawak) . . . . . 5. **kingii**

Leaves drying reddish-brown above, but a paler and often greenish-brown below; ♂ inflorescences longer and slenderer, up to 12 cm. long; flowers apparently smaller, more shortly tomentellous; fruits smaller, globose, up to 3·5 cm. in diameter (N. & E. Borneo) . . . . . 6. **arborea**

Leaves smaller and narrower, 2–7 cm. wide:

Leaves broadest at or below middle, rounded to slightly cordate at base, 5–10 cm. long, 2–4·5 cm. wide; lateral nerves about 6 pairs; ovary bilocular, styles 2 (E. Borneo) 12. **glochidiifolia**

Leaves mostly broadest above middle, narrowed toward base but sometimes rounded and abruptly subauriculate, mostly exceeding 10 cm. in length; lateral nerves about 8–10 pairs:

Leaves bearing on the lower surface, mostly near the base of the midrib, a small number of round, flat, discoid glands, 0·5–1 mm. in diameter; young branches and inflorescences conspicuously fulvous-tomentellous; leaves sometimes subauriculate at base, drying greenish; ovary trilocular, style 3 (Philippines) 10. **philippina**

Leaves without such glands; tomentum not, or less conspicuously, fulvous:

Ovary bilocular, styles 2; fruits 1-seeded (rarely 2-seeded), usually very asymmetrical, oblique and gibbous at base, covered with minute golden-tawny tomentellum; leaves rigidly coriaceous, 'shagreened' and dull greenish-pink when dry (Siam) . . . . . 11. **plagiocarpa**

Ovary trilocular, styles 3; fruits globose or pyriform, mostly 3-seeded, brown-tomentellous:

Leaves drying brown, sometimes 25 cm. long or more, chartaceo-coriaceous; tertiary nervation mostly smooth and inconspicuous below; ♂ inflorescences fairly robust (Malay Penins., N. Borneo, Java) . . 8. **javanica**

Leaves drying greenish, not exceeding 18 cm. in length, thinly chartaceous; tertiary nervation sharply elevated and conspicuous below; ♂ inflorescence very slender (N. & E. Borneo) . . . . . 9. **bacciformis**

ENUMERATION

1. **Ptychopyxis costata** *Miq.*, Fl. Ind. Bat., Suppl. 402 (1860); Hook. f. in Hook. f., Fl. Brit. Ind. **5**, 455 (1887) et in Hook., Ic. Plant. **18**, t. 1703 (1887); Boerl., Handl. Fl. Ned. Ind. **3** (1), 254, 293 (1900); Ridl., Fl. Mal. Penins. **3**, 295 (1924); Croizat in Journ. Arn. Arb. **23**, 48 (1942).

var. **costata:** foliis obovatis 7–12 cm. latis.

MALAY PENINSULA. Perak: Sungai Krian Estate, sea-level, 10 Jan. 1939, *Spare* 1838 (Sing. Field No. 36743): 'Riverside tree'.

SUMATRA. West Coast, Lubu-alang, *Teijsmann* (type!). Palembang, *n.d.*, *Buurman v. Vreeden* 235. Palembang, Banjoeasin en Koeboestreken, 22 Jan. 1916, *Grashoff* 950.—Native name: *resak lingèh.*

var. **oblanceolata** *Airy Shaw*, var. nov. foliis anguste oblanceolatis 3·5–8 cm. latis.

MALAY PENINSULA. Perak; Malacca; Negri Sembilan; Singapore: numerous collections. Typus: Perak, *sine loc. vel dat.*, fruiting specimen, *Scortechini s.n.* (Herb. Kew.).

Except for the specimen (*Spare* 1838) cited above under var. *costata*, the Peninsular collections of *Pt. costata* differ consistently from the Sumatran in their much narrower leaves. It is convenient, therefore, to accord them varietal distinction.

2. **Pt. caput-medusae** (*Hook. f.*) *Ridl.*, Fl. Mal. Penins. **3**, 295 (1924); Croizat, *l.c.*

Mallotus? *caput-medusae* Hook. f. in Hook. fil., Fl. Brit. Ind. **5**, 443 (1887).

MALAY PENINSULA. Perak; Malacca; Selangor; Singapore.

It is strange that the male flowers of this striking species have never been collected. The male plant distributed from Singapore as this species, under Sing. Field No. 36743 (*Spare* 1838), is, from the impressed tertiary venation, almost certainly referable to *Pt. costata* Miq., being a perfect match of Sumatran material; see above.

3. **Ptychopyxis triradiata** *Airy Shaw*, sp. nov., *Pt. caput-medusae* (Hook.f.) Ridl. ut videtur arcte affinis, sed fructibus minoribus (?) molliter tomentellis processubus omnine carentibus apice tricostatis manifeste diversa.

Arbor 15 m. alta. *Ramuli* teretes, 4–5 mm. crassi, brevissime griseo-fulvo-tomentelli. *Folia* obovata vel elliptico-obovata, 14–21 cm. longa, 6–9 cm. lata, basi rotundata, apice apiculata vel brevissime acuminata, apiculo vel acumine obtuso, margine integro plano; costa supra prominula tomentella, infra prominens tomentosa, nervis lateralibus gracilibus adscendentibus 10–12-jugis supra vix prominulis glabris subtus prominentibus puberulis, nervis tertiariis scalariformiter transversis subtus valde conspicuis puberulis; costa 1–1·7 cm. longa, 2 mm. crassa, tomentosa. *Inflorescentiae* ♂ ignotae. *Inflorescentiae* ♀ (statu fructigero tantum notae) abbreviatae, 2–2·5 cm. longae, axillares, rhachi tereti 2–3 mm. crassa dense fulvo-tomentella, bracteis minutis dense tomentellis, pedicellis 2–3 mm. longis tomentellis. *Calyx* (sub fructu) 5–6-merus, segmentis deltoïdeis 1 mm. longis dense

tomentellis. *Fructus* (verosimiliter immaturus) circiter 2 mm. diametro, depresse ovoïdeo-subglobosus, leviter tricoccus, dense brevissime sed molliter fulvo-tomentellus, apice costis 3 conspicuis obtusis radiantibus secus loculos ornatus, stylis 3 brevibus 2 mm. longis recurvis a basi liberis subtus tomentellis supra glabris asperatis, *Semina* trientem sphaerae efformantia, 1·4 cm. longa, 1·2 cm. lata, testa brunnea laevi.

Malay Peninsula. Perak: Bota Kiri Forest Reserve, near Ipoh, in forest, 15–30 m., 10 March 1958, *Mohd. Shah* 293: 'Tree ± 50 ft. tall. Fruits olive green.'

In characters of foliage, this species appears to be indistinguishable from *Pt. caput-medusae*, which is also known from Perak (as well as from other states of the Federation); but in fruit it is completely different. In *Pt. caput-medusae*, even before the curious processes commence to grow out of the young fruit, the indumentum is much longer and coarser than in the present species; and the final effect of the unruly 'mop' that develops on the mature fruit is utterly unlike the neat, smooth outlines of the shortly and softly tomentellous fruit of *Pt. triradiata*, the specific epithet of which refers to the 3 conspicuous ridges at the apex, radiating from the style-base. Further collections of this species are very desirable.

4. **Ptychopyxis grandis** *Airy Shaw*, sp. nov., *Pt. kingii* Ridley forsan proxima, sed foliis ingentibus usque 50 cm. longis et 19 cm. latis, petiolis robustis glabris ut videtur laxe corticatis, fructibus (an maturis?) anguste rostrato-ellipsoïdeis vel fusiformibus usque 9 cm. longis insigniter differt.

Arbor 12–15 m. alta. *Rami foliiferi* 5–8 mm. crassi, stricti, cortice cinereo glabro papyraceo. *Folia* per 6–12 pseudo-verticillata, oblanceolata vel anguste obovata, 34–55 cm. longa, 8–20 cm. lata, inferne sensim angustata, basi in petiolum abruptiuscule rotundato-contracta, ibique marginibus valde revolutis subtus quasi bullato-excavata et glandulis binis hemisphaericis bulliformibus vel convexo-disciformibus 1–2 mm. diametro conspicue notata, apice abrupte breviter (1·5–2 cm.) et tenuiter caudata, margine integra, subplana, coriacea, glabra, siccitate viridula, costa pro rata gracili supra et subtus obtuse prominula, nervis primariis lateralibus 14–15-jugis gracilibus late arcuato-patulis utrinque prominulis, nervis secundariis inter primarios angulo recto laxe regulariter clathrato-parallelis, mesophyllo supra vix nitente subtus distincte 'chagrinato'; glandulis perpaucis convexo-disciformibus per superficiem inferiorem hinc inde dispersis; petiolus robustus, 3–11·5 cm. longus, 3–5 mm. crassus, apice conspicue pulvinatus, pulvino usque 15 mm. longo et 8 mm. crasso, cortice conspicue laxe papyraceo exfoliante, transverse ruguloso et fisso, pulvino valde longitudinaliter sulcato et crebre transverse striato. *Inflorescentiae* ♂ (juniores tantum notae) rameales, usque 6 cm. longae, dense fulvo-tomentellae, alabastris jam vivis (teste Jacobs) colore *Rubi idaei* fructus, pedunculo sordide pallide aurantiaco. *Flores* ♂ nimis immaturi; sepala ut videtur 3–4, valvata; stamina valde numerosa. *Inflorescentiae* ♀ rameales, 1–2·2 cm. longae, fusco-brunneo-tomentellae. *Flores* ♀ tempore florendi ignoti, sed (e fructibus valde juvenilibus) calyx cupularis, irregulariter late 2- vel 3-lobus, lobis 4–5 mm. longis, submembranaceus, basi subtruncatus et annulari-pulvinatus. *Fructus juvenilis* anguste prismatico-lanceolatus, 2–3 cm. longus, 6–8 mm. diametro, purpureus, fusco-brunneo-tomentellus, stigmatibus 3 brevibus valde re-

curvis luteo-viridibus (teste collectore). *Fructus* (an maturus?) rostrato-fusiformis, 6·5–9 cm. longus (rostro 3–4 cm. longo incluso), 1·7–2·2 cm. crassus, obtuse trigonus, laevis, glaber, purpureus, basi calyce tumido nitido 10–12 mm. diametro brevissime trifido suffultus, apice e stylorum basibus persistentibus breviter trifidus, trilocularis, loculis 1-spermis. *Semina* (immatura) 7 mm. diametro.

Sarawak. 1st Division, N. slopes of Mount Penrissen (S. of Kuching), approx. 1° 5′ N., 110° 15′ E., primary forest on sandstone, 900–1000 m. alt., 5 Aug. 1958, *Jacobs* 5075 (♂ fls.): 'Tree c. 15 m. high; flower buds bright raspberry-red, on sordidly pale orange stalk'. 3rd Division, Kapit distr., Belaga subdistr., left bank of Rajang river c. 10 km. below Belaga, Segaham range, near Belaga airfield, approx. 2° 40′ N., 113° 50′ E., hills under 500 m. alt., primary forest on sandstone, 21 Aug. 1958, *Jacobs* 5218 (♀ fls.) (typus, Herb. Kew.): 'Tree c. 12 m., leaves crowded at the top of the twigs; ramiflorous, calyx green/purplish, ovary purple, stigma yellow-green'. *Ibid.*, *Jacobs* 5218A: 'additional fruits (ripe?), of the same purple colour as the young ovary, yellow inside, 3-locular'.

This very interesting species may perhaps be regarded as the most 'primitive' yet known in the genus. Its relationship to the remaining species may be compared to the relationship of *Gonystylus areolatus* Domke ex Airy Shaw to the remainder of that genus (cf. Fl. Males., ser. 1, **4**(4), 351, fig. 2, 353–4: 1953). The relatively immense leaves, with their massive petioles covered by a curiously loose and papery skin, are very distinctive, as also is the remarkable rostrate-fusiform fruit. Although the leaves of *Jacobs* 5218 are twice the width of those of No. 5075, I have no doubt that this represents no more than a local or individual variation. It is greatly to be hoped that fully mature fruits will one day be collected.

5. **Pt. kingii** *Ridl.*, Fl. Mal. Penins. **3**, 296 (1924).

'A tree 50–60 ft.; branches, petioles, racemes, rusty-tomentose; leaves 10–16 in., very coriaceous, shortly petioled, obovate oblong, obtuse or tip rounded, base acute subcordate or rounded, glabrous above except the mid-rib, sparsely pubescent beneath or glabrate, with 10–12 pair of strong nerves and transverse nervules, petiole 1–2 in., stout; fruiting racemes on the branchlets, 2–4 in., stout, woody, strict; pedicels very short and stout, minutely bracteate at the base; sepals ⅛ in., subpersistent, triangular-ovate, densely tomentose; fruit very large, 2–3 in. long, obovoid or broadly fusiform, 3-celled, more or less contracted at the pointed top, when dry with 6 slender ridges, deeply rugose between the ridges; pericarp very thick, ½ in., woody when dry, endocarp lining the cells crustaceous; seeds oblong, thick, dorsally convex, albumen copious, fleshy, coat thin.'—*Hooker fil. MS. in Herb. Kew.*

I have thought it of interest to reproduce the above MS. description, as it is evident that Hooker had originally intended to include the species in the 'Flora of British India', under the genus *Baccaurea*, with the epithet '*kingii*'. He had subsequently, however, found that it was not referable to that genus (a pencilled note attached to the above description reads: 'Not a *Baccaurea*: glands at base of leaf'), had put it aside, and had eventually—presumably by inadvertence—overlooked it for his account of the *Euphorbiaceae* in the Flora.

The following is the known distribution of the species, which has apparently not previously been recorded from Sumatra or Borneo.

Perak. Larut, Jan. 1883, *Kunstler* 3795: 'A tree 30 to 40 ft. high with spreading branches. Stem 12 to 18 in. in diam. Leaves glossy darkish green, when young of a lighter shade. Fruit turn orange yellow when ripe.' *Ibid.*, dense jungle, rocky localities, 750–900 m., Dec. 1884, *King's Collector* (*Kunstler*) 6918: 'A tree with spreading branches 40 to 50 ft. high, stem 10 to 15 in. in diam. Leaves dark glossy green. Fruit pear-shaped 2½ to 3 in. long by 2 in. in diam., of a fine light green color.' *Ibid.*, open jungle, hilly localities, 150–300 m., Feb. 1885, *King's Collector* 7279: 'A tree 50 to 60 ft. high. Stem 10 to 15 in. in diam. Leaves dark green, of a hard nature. Fruit, pear shape, pale green, 2 to 2½ in. long by nearly 2 in. thick.' Taiping hill, 750 m., 28 Feb. 1924, *Md. Haniff* 12821: 'Tree 30–35 ft. tall.' (Fruiting).

Pahang. Kemansul Reserve, Temerloh, 28 Sept. 1925, *For. Ranger Hamid* 10647. (♂ fl.).

Johore. Mawai, 10 Jan. 1938, *Ngadiman* (*Singapore Field No.*) 34710: 'Tree 25 ft. tall.' (Fruiting).

Sumatra. East Coast: Masihi, Asahan, n.d., *Yates* 2638. (♂ fl.).

Sarawak. Rejang, Sibu, March 1893, *Kalong for Haviland* 3079. (♂ fl.). Near Kuching, 2 Feb. 1892, *Haviland & Hose* 3673 K: 'Stamens white'. (♂ fl.).

6. **Ptychopyxis arborea** (*Merr.*) *Airy Shaw*, comb. nov.

Mallotus arboreus Merr., Pl. Elm. Born., in Univ. Calif. Publ. Bot. **15**, 159 (1929).
Baccaurea sp. (No. 2, quoad *Elmer* 21245 et 21672), Merr. in *tom. cit.* 153.

North Borneo. Near Tawao, in dense forests, Oct. 1922–March 1923, *Elmer* 20759, 20795, 20854 (type), 21245, 21672: 'A tree, its trunk 15 to 60 cm. in diameter. Inflorescences chiefly along the branchlets below the leaves, the calyx pale green, stamens pale yellow, intrastaminal glands deep yellow. Fruits depressed-globose, up to 3·5 cm. in diameter, densely ferruginous-pubescent, chiefly from the main branches, although in 21672, at least sometimes, in axillary racemes. Pulp juicy, edible, sweet.' Bettotan, Sandakan, top of hill, 45 m., 21 April 1935, *Puasa* 4639: 'Tree, 40 ft. high, 36 in. girth. Fruit azure [!?], edible.' Native name (Kedayan): *luagan lagan.* Kabili-Sepilok Forest Reserve, compartment 10, rolling land, 18 m., 2 March 1937, *Puasa* 7031: 'Tree, 15 ft. high, 6 in. girth.' (Sterile). Native name (Kedayan): *tarip.* Sepilok Forest Reserve, 15 miles W. of Sandakan, compartment 7, 105 m., 26 April 1955, *G. H. S. Wood* 16240: 'Tree, height 25 ft.' (♂ fl.).

East Borneo. E. Kutei (Sangkulirang subdiv.), Sg. Menubar region, ridge, loam soil with lime, 60 m., 21 June 1951, *Kostermans* 5356: 'Tree 15 m., bole 7 m., strongly fluted. Bark rather rough, not peeling off, light brown, ½ mm. thick. Living bark 4 mm., brown. Wood pale brown. Fls. (♂) pale green.' Native name: *mardjilawat.* E. Kutei, Sg. Kerajaan, N. of Sangkulirang, 20 m., marshy ground, loam soil with coral limestone, 18 July 1951, *Kostermans* 5816: 'Tree 20 m., bole 10 m., diameter 50 cm. Bark black-brown, smooth, pitted, 1 mm. thick. Living bark 3 mm., red-brown.

Wood dirty white. Flowers (♂) dirty pale yellow.' Sangkulirang Distr., Mt. Medadem, N. of Sangkulirang, on sand and limestone, 150 m., 4 Aug. 1957, *Kostermans* 13317: 'Tree 5 m., diameter 10 cm. Fruit yellow, aril sweet, jelly-like.' Native name (Bassap Dayak): *lebui*. Berouw, Mt. Ilas Bungaan, 600 m., limestone, 11 Sept. 1957, *Kostermans* 13794: 'Tree 20 m., diameter 35 cm. Buttresses small, irregular, merging into the fluted base of the bole. Bark smooth, light brown. Living bark pale brown, 5 mm. Wood pale brown, darker towards centre. Fruit green.' Berouw, Mt. Ilas Mapulu, limestone, 400 m., 22 Sept. 1957, *Kostermans* 14011: 'Tree 25 m., diameter 40 cm. Buttresses 40 cm., out 1 m., concave, merging into the strongly, very regularly fluted bole, the ribs being cylindrical. Bark pale rusty, roughish. Living bark 8 mm., pale orange. Sapwood 4 cm., pale brown. Heartwood brown. Fruit dark green with dark brown hairs.'

It is curious that Merrill failed to place this plant in its proper genus, in spite of having almost complete material before him—and even assigned the flowering and fruiting material to different genera! The species is very close to *Pt. kingii* Ridl., and I am not sure that the differences given in the above key will hold when more abundant material becomes available.

7. **Ptychopyxis chrysantha** (*K. Schum.*) *Airy Shaw*, comb. nov.

Mallotus chrysanthus K. Schum., Fl. Kais. Wilh. Land, 78 (1889); K. Schum. & Lauterb., Fl. Deutsch. Schutzgeb. Südsee 394 (1901).
Clarorivinia chrysantha (K. Schum.) Pax & K. Hoffm. in Engl., Pflanzenr. IV. **147**, VII, 17 (1914).
Clarorivinia grandifolia Pax & K. Hoffm. in Engl., Pflanzenr. IV. **147**, XIV (Euphorb.-Addit. VI), 13 (1919), *e descr.*

NEW GUINEA. Territory of New Guinea (Kaiser Wilhelmsland): Augusta R. [Sepik R.], Lagerberg der II. Augusta-Station, 1887, *Hollrung* 739 (♂), 756 (♀; *lectotypus*, Herb. Kew.)—Also probably: Kaiserin-Augusta R. Expedition, Camp 1 (Zuckerhut), primary forest, 200–300 m., Apr. 1912, *Ledermann* 7039 (type of *Clarorivinia grandifolia* Pax & Hoffm.; not seen).

It is interesting and somewhat unexpected to find that the genus *Ptychopyxis* is represented in New Guinea, and moreover in the eastern half of the country. Pax & Hoffmann located their new genus *Clarorivinia* quite close to *Podadenia* Thw. (which then comprised *P. thwaitesii* (Baill.) Muell. Arg. and *P. javanica* J. J. Sm.), indicating in their key that the latter genus was distinguished from all others in the group *Bernardiiformes* by the absence of an hypogynous disk in the ♀ flowers. This character is, however, an unreliable one, since a disk is certainly present in the ♀ flowers of at least some species of *Ptychopyxis*.

In vegetative characters *Pt. chrysantha* is with difficulty distinguishable from *Pt. arborea* (Merr.) Airy Shaw, but in its very short, subcapitate ♀ inflorescences (if this be a constant character) it is very different, and in its bilocular ovary and 2 styles it is comparable only with *Pt. glochidiifolia* Airy Shaw (E. Borneo) and *Pt. plagiocarpa* Airy Shaw (Siam) (see below, pp. 372–4). The discovery of the fruit will be awaited with interest.

From description, I think it very probable that *Clarorivinia grandifolia* Pax & Hoffm. is only a form of *Pt. chrysantha* with larger leaves (30–36 × 14 cm. instead of 8–33 × 5–10·5 cm.) and much longer ♂ inflorescences (22 cm. instead of 3 cm.). The ♀ flowers and fruits are, however, unknown, and the type specimen is probably no longer in existence. It is to be hoped that further collections from the area may eventually become available.

8. **Pt. javanica** (*J. J. Smith*) *Croizat* in Journ. Arn. Arb. **23**, 49 (1942).

Podadenia javanica J. J. Sm. in Meded. Dept. Landb. **10**, 387 (1910); Pax & K. Hoffm. in Engl., Pflanzenr. IV. **147**, VII, 21 (1914).
Ptychopyxis angustifolia Gage in Rec. Bot. Surv. Ind. **9**, 248 (1922); Ridl., Fl. Mal. Penins. **3**, 296 (1924); Croizat, *l.c.* 48; **synon. nov.**

MALAY PENINSULA. Kedah; Penang; Perak. See Gage, *l.c.* Ridley, by an oversight, omitted all localities for this species in his Flora.
NORTH BORNEO. Mt. Kinabalu, Kiau, Nov. 1915, *M. S. Clemens* 9952. (Fruiting).
JAVA. Preanger, 1890, *Koorders* 27408; 1891, *Koorders* 27418; *Koorders* 12234β; see Smith, *l.c.*

The Peninsular material of *Pt. angustifolia* Gage is a perfect match for the type of *Podadenia javanica* J. J. Sm., which I have been able to examine by the courtesy of the Director of the Leiden Herbarium. It is to be expected that the species will eventually be found in Sumatra also.

9. **Pt. bacciformis** *Croizat* in Journ. Arn. Arb. **23**, 49 (1942).

Coelodepas sp.? Merr. in Univ. Calif. Publ. Bot. **15**, 156 (1929).

NORTH BORNEO. Near Tawao, in dense forests, Oct. 1922—March 1923, *Elmer* 21524 (type), 21771: 'A slender tree, its trunk 15 to 20 cm. in diameter.' (Fruit). Kalabakan, 30 miles WNW. of Tawau, Bombay Burmah Trading Corpn. Concession area, compartment 7, sub-cpt. 2, 195 m., 28 June 1955, *G. H. S. Wood* 15264: 'Tree, height 50 ft.' (♂ fl.).
EAST BORNEO. West Kutei, Mt. Maranga on Tundjung Plateau, 200 m., 29 July 1956, *Kostermans* 12578: 'Tree 20 m., diam. 40 cm. Bark smooth, light brown, ½ mm. Living bark 4 mm., brown. Wood red-brown, rayed, sweetly smelling. Flowers (♂) green.' W. Kutei, along Belajan River, near Tabang, 100 m., 22 Aug. 1956, *Kostermans* 12674: 'Tree 20 m., diam. 45 cm. Base of bole fluted. Bark smooth, dark brown, ½ mm. Living bark 6 mm., pale brown. Wood light brown, hard. Fruit green. Bark fissured rather superficially.'

Pt. bacciformis has, as Croizat points out, 'more definitely lanceolate', i.e. *ob*lanceolate, leaves than *Pt. philippina*, which it otherwise resembles.

Wood 15264 has unusually narrow leaves (3–3·2 cm. wide) and slender ♂ inflorescences, 6–10 cm. long.

Kostermans 12578, in its more coriaceous leaves, drying brownish, and more robust ♂ inflorescence, makes a distinct approach towards *Pt. javanica* (J.J.Sm.) Croiz.

The following sterile specimen appears to represent this or a related species.

SUMATRA. Tapanoeli, Sibolga c.a. Boschgeb. Koealo Poelo Talam, 150 m., 13 May 1935, *Neth. Ind. For. Service* b.b. 19659 (Herb. Lugd.-Bat.).

10. **Pt. philippina** *Croizat* in Journ. Arn. Arb. **23**, 49 (1942).

PHILIPPINES. Mindanao : Surigao, 10 June 1927, *Wenzel* 2710 (♀ fl.) (*lectotypus*!); 19 July 1927, *Wenzel* 3051 (fruit); 28 July 1928, *Wenzel* 3501 (♂ fl.).

This species is superficially very similar to *P. bacciformis*, but the curious flat discoid glands on the lower surface of the leaves distinguish it sharply from that and all other species, except *P. poilanei* Croiz. The fruiting specimen, *Wenzel* 3051, was not cited by Croizat in his original description.

10a. **Pt. poilanei** *Croizat* in Journ. Arn. Arb. **23**, 50 (1942).

INDO-CHINA. Annam, *Poilane* 6398 (*non vidi*)*.

From Croizat's description I am not able to discover how this differs from *P. philippina*, except in the slightly smaller leaves.

11. **Ptychopyxis plagiocarpa** *Airy Shaw*, sp. nov., ovario biloculari stylis 2 fructu asymmetrico fabiformi (semine in altero loculo aborto), foliis utraque pagina quasi chagrinatis, in genere unica.

Arbor 30 m. alta. *Ramuli* usque 5 mm. crassi, recti, cortice pallide cinereo. *Folia* anguste elliptica vel leviter oblanceolata, 8–16 cm. longa, 2–4·5 cm. lata, basi anguste vel late cuneata, apice breviter acuminata, margine plano integro, siccitate rigide coriacea, glaberrima, supra obscure infra pallide brunnea, utraque pagina sub lente manifeste 'chagrinata'; costa supra prominula vel subplana, subtus valde prominens, nervis lateralibus gracillimis adscendentibus 9–12-paribus supra planis subtus argute prominentibus, nervulis transversis supra obscuris subtus ± manifestis; petiolus gracilis, 1–1·8 cm. longus, apice leviter pulvinatus; stipulae minutae, subulatae. *Inflorescentiae* ♂ ignotae. *Inflorescentiae* ♀ (statu fructigero tantum notae) 2–7 cm. longae, apicem ramulorum versus aggregatae, rhachi gracili 1–2 mm. crassa striata minute fulvo-velutina, bracteolis subulatis 2 mm. longis, pedicellis 2–4 mm. longis. *Calyx* sub fructu persistens, segmentis 5–6 subulato-deltoïdeis 1 mm. longis acutis puberulis. *Capsula* (vix matura) valde asymmetrica, subfabiformis, 1·7–1·8 cm. longa, 1–1·2 cm. lata, altero latere convexa basi et apice gibba, altero latere subplana apice tantum gibbositate parva instructa, dorso et ventre linea suturali manifesta percursa, superficie levissime granulari-rugulosa, conspicue sed minute aureo-velutina; stylus inter gibbositates apicales exortus, 1–1·5 mm. longus, bifidus, ramis patentibus revolutis. Rarius capsulae symmetrice biloculares evolutae sunt (in specimine viso 20 asymmetricae et 2 symmetricae), tunc 1·4–1·5 cm. latae. *Semen* (vix maturum) 1·7 cm. longum, 1 cm. latum, testa grisea.

* The type has now been examined, and I shall hope to publish a note on it later.

SIAM. Rachaburi Circle: Kwae Noi River Basin Exped., near Neeckey, near Wangka, on slope near stream, Ran Ti River, 150 m., 1 May 1946, *Kasin* 173: 'Tree, 30 m. high; bole 15 m., 0·5 m. diam.; bark thin, grey, inside tan colours; sapwood white, heartwood pale brown; crown broad, c. 10 m. wide; leaf green and shiny on the upper side; fruit green and velvety, oblong, 1 cm. in size.'

Although the flowers are not yet known, the foliage and fruits show this to be a very well marked species. The collector has noted that the leaves in the fresh state are 'shiny' on the upper surface, but when dried they are quite dull, both above and below, with a minutely granular or roughened appearance that can best be described as 'shagreened'. They are very rigidly coriaceous, and have a strong tendency to curl up on drying.

The asymmetrical, somewhat bean-like fruits are very curious and characteristic. In the material examined, fewer than 10 per cent of the fruits have developed both their seeds. The great majority are 1-seeded, and the outline of the fruit, as seen from the side, with its gibbous base and oblique carriage, is somewhat suggestive of a *Buxbaumia* capsule.

12. **Ptychopyxis glochidiifolia** *Airy Shaw*, sp. nov., foliis parvis ovatis usque oblongo-ellipticis basi rotundatis vel subcordatis laevibus glaberrimis in genere distinctissima.

Arbor 20–26 m. alta, ramulis gracilibus sed rigidis 2–4 mm. crassis teretibus fusco- vel cinereo-brunneis, novellis minute aureo-puberulis. *Folia* anguste ovata usque oblongo-elliptica, 5–10 cm. longa, 2–4·5 cm. lata, basi rotundata vel leviter cordata, apice breviter acuminata, acumine 5–10 mm. longo obtusiusculo sed saepe abrupte apiculato vel mucronato, margine plano integerrimo, coriacea, laevia, glaberrima (raro subtus basin versus puberula), siccitate supra brunnea vel fusco-brunnea, nitidula, subtus pallide brunnea, costa nervisque (5–7-jugis) utrinque prominulis, costa siccitate supra interdum conspicue rubida, nervis lateralibus adscendentibus procurvis inconspicue anastomosantibus, nervis tertiariis inter se irregulariter parallelis; petiolo gracillimo 1–2·5 cm. longo tereti basi et apice leviter pulvinato minute aureo-puberulo vel glabrescente; folia toto adspectu—figura, textura, colore exsiccando—*Glochidii* species valde in mentem revocantia. *Inflorescentiae* ♂ axillares, breves, simpliciter racemiformes, 10–20-florae, 1·5–2·5 cm. longae, graciles, adscendentes, fulvo-velutino-sericeae; bracteae lineari-subulatae, 1–2·5 mm. longae; pedicelli (ante anthesin) usque 4 mm. longi. *Calyx* (alabastro) subglobosus vel oblate ovoïdeus, 2–3 mm. diametro, apiculatus, adpresse sericeus, segmentis aegre discernendis ut videtur 4–5. *Receptaculum* ovoïdeum, inter filamenta ut videtur glandulis parvis subglobosis dense aureo-pubescentibus crebre obsitum. *Filamenta* brevissima, 0·5 mm. longa. *Antherae* generis, ovoïdeae, 0·75 mm. longae, dorsifixae, per paria majora et minora quadrilocellatae, connectivo in mucronem apicalem breviter producto. *Inflorescentiae* ♀ breves, 1–3 cm. longae, strictae, rigidae, simpliciter racemosae, adscendentes vel patentes, complures (3–9) in ramulo infra folia exortae, 6–10-florae, dense brevissime fulvo-tomentellae; pedicelli 1–3 mm. longi, patentes, rigidi, tomentelli, apice leviter expansi, bractea pedicellum suffulciente subulata 2 mm. longa cito caduca, bracteola apicali subulata 1 mm. longa fructu jam delapso persistente. *Calyx*

(4–) 5 (–6)-partitus, segmentis subulatis acutis 1–2 mm. longis tomentellis. *Discus* annularis, integer, tomentellus. *Staminodia* nulla. *Ovarium* subglobosum, 2–3 mm. diametro, dense tomentellum, biloculare; stylus nullus; stigmata 2, simplicia, valde recurva. *Fructus* (an maturus?) biglobosus, 1·5 cm. latus, 1·1 cm. longus, 1·1 cm. crassus, laevis, fulvo-velutinus, indehiscens (?), pericarpio tenui carnosulo, stigmatibus persistentibus ± adpressis, calyce persistente cum fructu caduco. *Semina* 2 (vel abortu 1), semiglobosa, 1·1 × 1·1 × 0·7 cm., sulco ventrali leviter percursa, testa laevi brunnea.

E. Borneo. Sg. Wain region, N. of Balikpapan, low hills, sandy loam soil, scattered, 50 m., 1950, *Kostermans* 4521 (type, Herb. Kew.): 'Tree 26 m., with 12 m. clear bole of 50 cm. diam., fluted. Bark smooth, grey. Fruit rusty brown.' *Ibid.*, 20 m., 6 Sept. 1950, *Kostermans* 4552: 'Tree 20 m.; fruit pale green.' Native name: *kayu api* (*kayu* = wood; *api* = fire). Sg. Mentawir region, near Balikpapan, low sandy ridges, 100 m., common, n.d., *Kostermans* 9855 (♂ fl.): 'Tree 15 m., diam. 25 cm. Bark smooth, pale brown, 0·5 mm. thick. Living bark 4 mm., pale. Wood pale honey-coloured. Petals white.'

In its small, smooth, glabrous, few-nerved, narrowly ovate leaves, which curl and turn brown in drying, and in its short, simply racemose ♀ inflorescences, bilocular ovary with 2 styles, and mostly 2-seeded fruit, this species is sharply distinct from all others in the genus. The general aspect of the foliage on drying is remarkably reminiscent of species of *Glochidion*.

Species excludenda

Ptychopyxis frutescens Croizat, *l.c.* 49 = **Koilodepas** sp. (*vide notulam* XI, p.385).

IX. THE FEMALE INFLORESCENCE, AND AFFINITIES, OF BOTRYOPHORA HOOK. FIL.

(P. & H. 110/a)

In my earlier note on the genus *Botryophora* Hook. fil. (Kew Bull. **3**, 484: 1948), I commented upon the great desirability of discovering the hitherto unknown female inflorescence of this taxonomically isolated plant.

While glancing recently through the herbarium material of the genus *Epiprinus*, I came upon an old sheet bearing a specimen from Sumatra, written up in J. D. Hooker's handwriting '*Epiprinus malayanus*'. In spite of a general similarity to this species, something about the specimen made me look at it more closely, and I then found, to my great delight, that it was in fact a fine leafy branch of *Botryophora*—bearing a female inflorescence! All but five of the flowers had, unfortunately, fallen, or been lost, but sufficient of the inflorescence remained to make possible the completion of the description of this interesting plant. It is regrettable that the only information on the sheet is the word 'Sumatra', in Sir W. J. Hooker's handwriting; this may possibly indicate William Marsden, who collected in the neighbourhood of Bencoolen in the 1770's, and some of whose specimens are present in the Hooker herbarium.—Shortly after this discovery, an excellent

specimen in young fruit, from E. Borneo, was found amongst a large consignment of material received from Bogor *.

The following is a description of the ♀ inflorescence and flowers, and also of the fruits and seeds from an imperfect Bornean collection.

Botryophora geniculata (*Miq.*) *Beumée ex Airy Shaw*

Inflorescentia feminea simplex, spicata, recta vel arcuata, 5–16 cm. longa. *Rhachis* 2 mm. (sub fructu usque 4 mm.) crassa, rigida, valde angulata, minute papilloso-puberula. *Flores* haud dense dispositi, sessiles, ex angulis rhacheos breviter lamelliformiter expansis exorti, bractea minuta anguste subulata 0·8 mm. longa arcte deflexa suffulti. *Sepala* 3–4, minuta, triangulari-subulata, 0·8 mm. longa, brevissime connata, sub disco occulta eique arcte adpressa. *Discus* magnus, pulviniformis, 3 mm. diametro, 1 mm. crassus, sulcis longitudinalibus in segmenta 6–8 conspicue et ± complete divisus. *Ovarium* disco insidens, breviter ovoïdeum et valde 3- vel 4-gonum, 2–3 mm. longum, 2 mm. latum, glabrum, laeve. *Stylus* brevissimus, crassissimus, in stigmata 3–4 crassa recurva supra valde hispido-papillosa 2 mm. longa desinens. *Ovula* in loculis solitaria, pendula, oblonga, majuscula, loculos fere implentia. *Fructus* juvenilis trigono-obpyramidalis, maturus (teste Merrill e speciminibus magis completis) globosus, circiter 3 cm. diametro, obscure 3-gonus, ut videtur capsularis et 3-valvis, 3-spermus, pericarpio ut videtur tenui crustaceo. *Semina* rotundato-subquadrata, subplano-convexa, 16 × 13 × 10 mm., sectione transversa elliptica, sectione longitudinali semi- vel potius sub-ovata, facie ventrali subplana sulco lato leviter percursa, testa pallide obscure brunnea.

Described from:—

Sumatra. Without further locality or collector, in Herb. Hooker; possibly Bencoolen distr., c. 1775, *Marsden.*

E. Borneo. Muan region, near Sg. Riko (Balikpapan bay), low hills, sandy loam soil on lime, 20 m. alt., Nov. 1950, *Kostermans* 4373: 'Fruit green'.

N. Borneo. Near Tawao, Oct. 1922—March 1923, *Elmer* 21137: 'A tree in dense forests, its trunk 60 cm. in diameter'. [*Ostodes* sp., Burkill ex Merrill, Pl. Elm. Born. in Univ. Calif. Publ. Bot. **15**, 164 (1929).]

In my previous note the latter specimen should have been cited instead of *Elmer* 21129, '*Blumeodendron* sp.', *l.c.* 157. Additional references to *Botryophora*, which I overlooked in the earlier note, are: Boerl., Handl. Fl. Ned. Ind. **3** (1), 197, 254, 293 (1900); Gage in Nova Guinea **12**, 486 (1917); v. Steenis, *ibid.*, n. ser. **7**(1), 8–9 (1956); Merr. in Papers Mich. Acad. Sci. **20**, 101 (1935).

An additional record from the Malay Peninsula may be cited here:

Johore. Sungai Kayu, in swampy forest, 10 Oct. 1936, *Kiah* (Singapore Field No.) 32032.

An illustration and full description of *Botryophora* (incorporating the above details) will be found in Hooker's 'Icones Plantarum' **36**, t. 3576 (1961).

* Since this was written, a number of specimens bearing ♀ flowers or fruits has been received on loan from the Forestry Department, Kepong, Malaya. Some notes on these may be given later.

Affinities

In spite of now having all parts of the plant available, I am unable to suggest a close affinity for this interesting plant. In his original description, Hooker wrote (Fl. Brit. Ind. **5**, 476: 1888): 'This may be allied to *Mallotus* or *Macaranga*, but I know nothing at all like it.' Although there is certainly some resemblance to the foliage of certain penninerved species of these genera, I do not think they can be regarded as close allies. There can be little doubt that *Botryophora* must be located, like these genera, in the Tribe *Acalypheae*, Subtribe *Mercurialinae*, but after that the way is far from clear.

The first author to attempt a definite assignment of the genus appears to have been Boerlage, who, in his Handl. Fl. Ned. Ind. **3**(1), 197 (1900), referred it to the Subtribe *Acalypheae*, next to *Ptychopyxis* Miq., amongst genera with non-fasciculate stamens and 3–4-locellate anthers. His arrangement seems to have been largely followed by Gage, in his key to the genera of *Euphorbiaceae* for the 'Materials for a Flora of the Malayan Peninsula, No. 26', in Journ. As. Soc. Bengal **75**(5), 469–544 (1936). This valuable account, written mostly before 1914 (*vide loc. cit.* 470), was most regrettably not published at the time. Meanwhile Ridley's complete Flora appeared, with a treatment of *Euphorbiaceae* presumably based largely upon Gage's MS., and it was therefore decided by the Royal Asiatic Society of Bengal that only Gage's generic keys and the first 42 pages of his detailed descriptions should be published.

In his general key, or conspectus, Gage places *Botryophora* next to *Blumeodendron*, the two genera being associated under the common key-heading (*l'*): 'Filaments imbedded between the lobules of a large convex central glandular mass' (p. 475). In doing this, however, Gage overlooked the fact that this heading is subsumed under the earlier key-heading *g*: 'Anther-cells 2', which is true for *Blumeodendron*, but not for *Botryophora*, which has 4 minute pendulous locelli. This would bring it under his key-heading *g'*: 'Anthers with 3–4 locelli', next to *Ptychopyxis*, *Cleidion*, *Macaranga* and *Endospermum*. One can scarcely feel, however, that *Botryophora* is particularly closely related to any of these genera. In his special key to the male plants of dioecious genera, Gage keys out *Botryophora*, with a number of other genera, under the heading: 'Disk or glands absent', with the special distinction: 'Anthers peltate on disciform connectives and imbricate to form a globose central tesselated mass' (p. 481). There would thus appear to have been some uncertainty or lack of clarity in his own mind as to the presence or absence of 'glands', and it is evident that a good deal hinges upon the interpretation of the small inter-staminal processes or irregularities present in the male flowers.

In Gage's key to the female plants of dioecious genera, *Botryophora* would key out quite clearly as follows: 'Leaves simple, alternate. Cells of ovary 1-ovuled. Flowers apetalous. Disk or glands present. Calyx valvate or dentate. Ovary and fruit usually 3-locular; stigmas subulate. Fruit globose, large, indehiscent . . . . . .44. *Blumeodendron*.' In the female flower of *Botryophora* the disk is large and conspicuous, and this limits the possibilities in Gage's key to *Endospermum* (excluded by 2-locular ovary and subpeltate stigmas), *Claoxylon* (excluded by small, sulcately tricoccous fruit, and of course by total habit), *Chaetocarpus* and *Gelonium* (both excluded by imbricate

calyx-segments), and *Blumeodendron*. It is not quite true to say that the fruit of *Blumeodendron* is 'indehiscent': although many fruits present in herbaria show no sign of dehiscence, it is clear that they are, in fact, in most cases ultimately dehiscent. J. J. Smith (in Koord. & Val., Bijdr. No. 12 Booms. Java, in Meded. Dep. Landb. **10**, 459: 1910) describes the fruit thus (transl.): 'Fruit large, globose, smooth, dehiscing into 2–3 valves, the inner and outer walls not separating.' 'Tardily dehiscent' should be substituted in Gage's key for 'indehiscent'. As far as can be judged from the imperfect material available, the fruit of *Botryophora* would seem to be of a very similar type.

The seeds of the two genera are also superficially somewhat similar; but, whereas those of *Botryophora* are more or less bluntly quadrate in outline, those of *Blumeodendron* are transversely oblong or transversely elliptic, or 'bean-shaped', even (according to Smith) somewhat triangular, the point of attachment being in the middle of the longest side.

In Ridley's key to the genera of *Euphorbiaceae* (Fl. Mal. Penins. **3**, 178: 1924), *Blumeodendron* and *Botryophora* are likewise placed together, under the heading: 'Stamen-receptacle glandular lobed; stamen-connective broad, buds globose bursting irregularly.'*

In Pax & Hoffmann's key (Engl., Pflanzenfam., ed. 2, **19c**, 35: 1931), one reaches the Subtribe *Mercurialinae*, after which, if one assumes that a disk is present in the male flower of *Botryophora*, and that the anther-loculi are pendulous, one has to choose between 'Free disk-glands between the stamens' and 'The entire ♂ flower-axis plicate-glandular'. In the former case, because the anthers are 4-locellate, one arrives at *Bernardia* and *Discocleidion*, neither of which would appear to have any claim to relationship with our plant; in the latter case one is at once led to the genera *Blumeodendron*, *Argomuellera* and *Pycnocoma*, but is then confronted with the surprising statement: 'Stellate pubescence. Malaysian. 110. *Blumeodendron*', the other genera being assigned 'Simple hairs.' I have failed to trace the source of this statement. In their generic description of *Blumeodendron* the authors say: 'Trees with very small stellate hairs, very soon becoming glabrous'. J. J. Smith, in his very detailed descriptions of Javanese *Blumeodendron* species (*l.c. supra*), makes no mention of such hairs, or indeed of any pubescence. The only trace of indumentum that I have been able to find on herbarium specimens is a little rusty pubescence on some very young apical leaf-buds, but it does not appear to be stellate.

The general consensus of evidence thus seems to indicate *Blumeodendron* as perhaps the nearest known relative of *Botryophora*. There are obviously a number of important points in common. But there are also so many points of divergence, both in vegetative and in floral characters, that the relationship can scarcely be regarded as a close one. The curious 'cycadeoid' stamens (*cf.* Hooker, *l.c. supra*), in particular, seem to represent a type that is unique in the *Euphorbiaceae*.

In closing this brief review, I must mention an interesting published reference to *Botryophora* that could easily be missed.

* In his generic description of *Botryophora* (*l.c.* 282), Ridley erroneously speaks of '2 minute oblong cells' pendulous from the margin of the disc-shaped connective. There are, of course, 4 such anther-cells.

After the publication of my original note in 1948, I was informed—I think by Dr. van Steenis—that Dr. J. G. B. Beumée, whose name appeared as the author of the new combination *Botryophora geniculata* on the label of a specimen distributed from the Bogor Herbarium before the last war, had made some comments on the species in an address delivered at Wageningen in November 1947, and reprinted as a separate leaflet. In response to my request, Dr. Beumée was good enough to send me a copy, as well as one for the Kew Library. The address is entitled: *Hoe het groeide* ['How it grew']*. In it Dr. Beumée devotes almost two full pages (pp. 10–12) to this species, giving amongst other things the story of the identification of an unknown Sumatran specimen with *Botryophora kingii* Hook. fil. (from description), and then of the eventual identification of this with *Sterculia geniculata* Miq. by a *mantri* of the Bogor Herbarium. He also refers to the reluctance that Dr. J. J. Smith, the great authority on Malaysian *Euphorbiaceae*, at first felt, on account of the highly peculiar stamen-structure, to admit *Botryophora* into the family at all! His misgivings, however, were ultimately overcome. Dr. Beumée further makes brief reference to the question of the morphological nature of the small protuberances occurring on the receptacle between the stamens, and mentions the tentative suggestion that they might perhaps be interpreted as vestigial perianth-members surrounding unistaminate ♂ flowers, as in *Euphorbia*. In a personal letter to me, however, he inclines to dismiss this suggestion, and to believe that the best place of *Botryophora* is, after all, among the *Acalypheae–Mercurialinae–Bernardiiformes* of Pax & Hoffmann, *i.e.* in the group including *Blumeodendron*.

X. A SYNOPSIS OF THE GENUS CEPHALOMAPPA BAILL.

(P. & H. 148)

The detection of two undescribed species of *Cephalomappa* gives the occasion to draw up a key and to summarise the little that is known of this small genus.

Key to the species and varieties

Leaves entire, or with only faint undulations, usually drying reddish brown below (Sarawak) 3. **beccariana**

Leaves densely fasciculate-pubescent below . . . . . var. *beccariana*

Leaves rather closely and minutely stellate-lepidote below . . . . var. *havilandii*

Leaves (except for the tomentellous nerves) almost glabrous below, or with very minute scattered fascicled hairs . . . . . var. *hosei*

Leaves distinctly crenulate or denticulate:

Leaves quite glabrous below (midrib occasionally excepted), usually drying greenish; margin crenulate-dentate; petiole 5–10 mm., rarely up to 15 mm. long (Borneo):

Lateral nerves 8–11 pairs; hill plant . . . . . 4. **malloticarpa**

Lateral nerves 4–6 pairs; plant of freshwater swamp forests . . . 5. **paludicola**

Leaves not quite glabrous below; petiole usually considerably exceeding 1 cm.:

Leaves densely stellate-lepidote below, drying fuscous-brownish; margin crenulate-dentate (Johore; Sumatra) . . . . . 2. **lepidotula**

Leaves sparsely and minutely fasciculate-pubescent below, drying brown above and greenish below; margin very shallowly denticulate, sometimes appearing subentire; branches, inflorescences and petioles more strongly velutinous than other species (Penang, Trengganu)) . . . . . 1. **penangensis**

* *Hoe het groeide*: Openbare Les gehouden bij de aanvaarding van het ambt van Lector aan de Landbouwhogeschool op 24 November 1947 door Dr. J. G. B. Beumée. H. Veenman & Zonen, Wageningen.

ENUMERATION

1. **Cephalomappa penangensis** *Ridl.* in Bull. Misc. Inf., Kew **1923**, 368 (1923), et Fl. Mal. Penins. **3**, 279 (1924).

PENANG. Reserve line, West Hill, April 1888, *Curtis* 1571: 'Large shrub'. Back of West Hill, 300 m., March 1901, *Curtis* 3584: 'Tall tree'.

TRENGGANU. Off 23rd mile, Kuala Trengganu–Besut road (west side), lowland forest, 15 Sept. 1955, *Sinclair & Kiah bin Salleh* (*Singapore Field No.* 40866): 'Tree 40 ft. high. Leaves dark green and glossy above, paler green beneath with midrib and nerves brownish green'.

2. **Cephalomappa lepidotula** *Airy Shaw*, sp. nov., a *C. penangensi* Ridl. (foliis subtus fasciculato-pilosis) et *C. malloticarpa* J. J. Sm. (foliis subtus fere glabris) foliis subtus dense minute stellato-lepidotulis facile distincta; a *C. beccariana* Baill., pariter foliis subtus lepidotulis vel tomentellis gaudente, foliis ut in *C. malloticarpa* manifeste crenulato-dentatis differt.

Arbor? statura ignota. *Ramuli* teretes vel tenuiter costulati, usque 5 mm. diametro, primum minute furfuracei, demum glabrescentes, cortice laevi fusco-brunneo. *Folia* dissita vel apicem ramulorum versus congesta: petiolus 1–5 cm., interdum usque 8 cm. longus, 1–2·5 mm. crassus, teres, tenuissime striatulus, basi apiceque leviter incrassatus, apice geniculatus, praesertim basi et apice stellato-furfuraceus; limbus ovatus vel elliptico-oblongus, 9–15 cm., interdum usque 25 cm. longus, 4–11 cm. latus, basi rotundatus usque latissime cuneatus, brevissime glanduloso-biauriculatus, apice breviter (1–2 cm.) acuminato-caudatus, margine plerumque conspicue crenulato-dentatus, crenulis obtusis, modice coriaceus, siccitate supra fusco-brunneus, subtus pallidior, supra glaber, obscurus vel vix lucidulus, subtus densissime minute stellato-lepidotulus, costa nervisque gracilibus supra planis vel basin versus prominulis subtus modice prominentibus. *Inflorescentiae* (♀ vetustiores tantum visae) generis, axillares, subsimplices vel parce ramosae, 3–5 cm. vel sub fructu usque 10 cm. longae, furfuraceae. *Perianthium* non visum. *Ovarium* dense molliter echinatum, crasse stipitatum, stipite 1–2 mm. longo dense fulvo-tomentoso. *Capsula* (vix matura) trilocularis, 1·5 cm. diametro, firme lignoso-echinata, dense sordide albido-tomentella, processubus elongate prismatico-conicis 3–4 mm. longis.

MALAY PENINSULA. Johore: Mawai, low altitude, 21 May 1934, *Corner* (Singapore Field No.) 28173. Johore: Sungai Berassau, Mawai–Jemulang road, low altitude, 6 Feb. 1935, *Corner* (Sing. Fld. No.) 28951: 'Common locally in swampy forest'.

SUMATRA. Provincia di Padang: Sungei bulu, near sea level, Sept. 1878, *Beccari* 975 (*typus*, Herb. Kew.).

This may well be the species referred to by J. J. Smith, in Bull. Jard. Bot. Buitenz., sér. 3, **6**, 97 (1924), in his mention of 'very poor material of a tree, originating from Sumatra, Palembang', which he had received from the Forest Experiment Station in Buitenzorg. In its combination of densely stellate-lepidotulous lower leaf-surface and (mostly) conspicuously crenulate-dentate leaf-margins, it is well distinguished from the remaining species.

3. **C. beccariana** *Baill.* in Adansonia **11**, 131 (1874); Pax in Engl., Pflanzenr. IV. **147**, II, 17 (1910); Merr. in Journ. As. Soc. Str. Br., **1921**, Spec. No. 343 (1921).

The indumentum of the lower leaf-surface of *C. beccariana* shows considerable variation, and the following forms may be recognised.

var. **beccariana**: foliis subtus dense fasciculato-pubescentibus.

Sarawak. Sine loc. exact., 1865–68, *Beccari* 425 (♂ fl.; *type*). Matang, Jan. 1915, *Ridley s.n.* (fruit) (mixed with *Macaranga* sp.).

var. **havilandii** *Airy Shaw*, var. nov., foliis subtus minute densiuscule stellato-lepidota.

Sarawak. Near Kuching, 5 Jan. 1893, *Haviland* 2081 (young buds): 'Small tree'. *Ibid.*, 4 Jan. 1893, *Haviland* 2184 (♂ & ♀ fl.; *type*, Herb. Kew.): 'Small tree'. *Ibid.*, 21 March 1893, *Haviland & Hose* 3211 (fruit).

var. **hosei** *Airy Shaw*, var. nov., foliis subtus (nervis tomentellis exceptis) pilis minutissimis fasciculatis sparsis praeditis.

Sarawak. Baram, March 1895, *Hose* 303 (♂ & ♀ fl.).

4. **C. malloticarpa** *J. J. Smith* in Bull. Jard. Bot. Buitenz., sér. 3, **6**, 95 (1924).

Sarawak. Mt. Poi, Base Camp, forest slope, 600 m., 3 Oct. 1929, *J. & M. S. Clemens* 20197: 'Tree, 50 ft.; fruit brown'.

E. Borneo. E. Kutei (Sangkulirang subdiv.), Sg. Menubar region, on ridge, 80 m. alt., loam soil with lime, 21 June 1951, *Kostermans* 5376: 'Tree 15 m., bole 7 m., diam. 25 cm. Buttresses 50 cm. high. Bark rather smooth, brown, ½ mm. thick. Living bark 2 mm., pale brown. Wood white. Fruit dull pale green'. —Native name: *perupuk batu.*

Java? Mt. Salak?

In his original description, Smith states: 'The description was drawn up from four trees cultivated in the Buitenzorg Gardens . . . The labels state that these plants originate from Mt. Salak near Buitenzorg. This information, however, seems to be somewhat doubtful as the species has never been met with again there' (*l.c.* 97). The discovery of the above-cited two specimens from widely separated localities in Borneo tends to confirm Smith's suspicions, and to suggest that the plants cultivated at Buitenzorg were, in fact, of Bornean origin. It may be noted, however, that, whereas the cultivated material dries a greenish colour, one of the Bornean specimens has dried a dark brown, and the petioles are up to 1·5 cm. long.

5. **Cephalomappa paludicola** *Airy Shaw*, sp. nov., *C. malloticarpae* J. J. Sm. affinis, sed foliis obscurius crenulatis vel denticulatis nervis primariis tantum 4–6(–7)-jugis (nec 8–11-jugis), costa paullo robustiore supra magis prominente, nervis tertiariis plerumque obscurioribus, colore exsiccando plerumque pallide castaneo, oecologia praeterea aliena differt.

Arbor 6–18 m. alta. *Ramuli* teretes, usque 4 mm. crassi, cortice fusco, novellis densiuscule lepidotulis mox glabrescentibus. *Folia* varia, plerumque elliptica, interdum ± ovata vel obovata, 7–12 cm. longa, 2·5–5 cm. lata, raro anguste elongate elliptica, 14–15 cm. longa et 3·8 cm. lata, inferne cuneata, ima basi in petiolum abrupte angustata, interdum leviter subauriculata, glandula magna rotundata fusca utroque latere costae notata, apice acuta vel apiculata vel breviter acuminata, apiculo obtuso usque subacuto, margine minute sed distincte (interdum indistincte) et remotiuscule denticulato vel subcrenulato, firme coriacea, glaberrima, siccitate plerumque pallide castanea; costa pro rata valida, utraque pagina prominens, nervis lateralibus paucis, 4–6 (–7)-jugis tantum, haud manifeste anastomosantibus, utraque pagina prominulis; petiolus 3–9 mm. longus, rugulosus, apice pulvinatus, ± persistenter lepidotulus. *Inflorescentiae* statu valde juvenili tantum cognitae, dense lepidotulae: glomerulae ♂ globosae, multiflorae, aggregatae, brevipedunculatae vel subsessiles; flores ♀ solitarii, longipedunculati, pedunculo gracili 1·4–2·3 cm. longo, calycis segmentis parvis subulatis 1 mm. longis, ovario ovoïdeo 2 mm. diametro muricato-papilloso stellato-lepidotulo, stylo brevissimo truncato subglabro. *Capsula* tricocca, 2·2 cm. diametro, 1·5 cm. alta, muricata, aculeis pyramidalibus 1–2 mm. longis acutis. *Semina* circiter 1 cm. diametro, testa laevi subnitente brunneo-marmorata.

Sarawak. Betong Distr., Sebuyan P.F., low alt., in peat swamp forest, 6 June 1957, *Zehnder* 4767: 'Small tree, 30 ins. girth.' Betong Distr., Saribas For. Res., c. 3 m. alt., in peat swamp forest, 13 Aug. 1957, *Anderson* 8540: 'Small tree, 50 feet high, 20 ins. girth; very abundant.' (Vernacular name: *ahrau*). Sibu Distr., Naman For. Res., low alt., in peat swamp forest, 26 Nov. 1957, *Anderson* 8953: 'Small tree, 19 ft. high, 5 ins. girth.' (Vern. name: *ahrau*). Sibu Distr., Sg. Asam, Naman For. Res., 3·5 m. alt., 14 Apr. 1958, *Anderson* 5123: 'Small tree. Leaves taken from branch after felling.' (Vern. name: *ahran* [sic].) Binatang Distr., Surong trib., Daro For. Res., low alt., in peat swamp forest, 30 Jan. 1958, *Sanusi bin Tahir* 9713 (type, Herb. Kew.): 'Tree, 60 ft. high, 16 ins. girth. Flowers yellow.' (Vern. name: *arau*). Binatang Distr., Surong Irit, 3·5 m. alt., in peat swamp forest, 2 May 1958, *Sanusi bin Tahir* 5235: 'Tree 29 ft. high, 14 ins. girth.' (Vern. name: *pela* [Mil. Oya].)

This species is of particular interest as being a hitherto unrecognized component of the freshwater peat swamp forests of north-west Borneo. Among characteristic elements already known from this formation may be mentioned: *Gonystylus bancanus* (Miq.) Kurz, *Dactylocladus stenostachys* Oliv. and *Combretocarpus rotundatus* (Miq.) Dans. It was in the course of a special investigation into these forests*, by Mr. J. A. R. Anderson, of the Sarawak Forest Department, that the present species was discovered. An interesting account of the corresponding formation in the Malay Peninsula has recently been published by Wyatt-Smith†.

* See Browne, F. G., Forest Trees of Sarawak and Brunei, 6–9 (1955); Anderson, J. A. R., Précis of Studies of Fresh-water Swamp Forests of Sarawak and Brunei, in UNESCO, Study of Tropical Vegetation 195 (1958); Kostermans, Note on Lowland Vegetation in Equatorial Borneo, *ibid.*, 155 (1958).

† Wyatt-Smith, J., Peat Swamp Forest in Malaya, Mal. For. **22** (1), 5–32, with map (1958).

C. paludicola is closely related to *C. malloticarpa* J. J. Sm.—likewise a native of Borneo, but found at considerably higher altitudes (80–600 m.)—and could conceivably be regarded as a subspecies of that species, adapted to the special swamp habitat. Herbarium specimens present a distinctive appearance owing to the light chestnut colour assumed on drying; the foliage has also an unusually smooth appearance. The most positive difference lies in the very much fewer primary nerves: whereas the leaves of *C. malloticarpa* have about 8–11 pairs, *C. paludicola* has only 4–6 (rarely 7).

It is curious that, although the above-cited six specimens were collected in six different months spread round the year, none of them is actually in flower. Those collected in June, August, November and January are all in young bud (the January specimen, indicated as type, being the most advanced), whilst the April and May gatherings have mature fruits. The flowering season is evidently February and March.

The whole habit of *Cephalomappa*—foliage, nervation, inflorescence, and fruit—is very suggestive of the genus *Ptychopyxis* Miq. The fruit of *Ptychopyxis caput-medusae* Ridl. is, in fact, almost like an immense, globose *Cephalomappa* fruit. The principal generic difference seems to lie in the male flowers: in *Cephalomappa* there are only 2–4 stamens, whereas in *Ptychopyxis* they are very numerous. I have little doubt that the two genera should be closely associated.

XI. A SYNOPSIS OF THE GENUS KOILODEPAS (COELODEPAS) HASSK., WITH A NOTE ON CALPIGYNE FRUTESCENS BL. (P. & H. 151)

Whilst working on the genus *Ptychopyxis* Miq., the writer found it necessary to examine the type material of *Pt. frutescens* Croizat in order to determine its relation to the remaining species of the genus. This species had been based upon the little-known *Calpigyne frutescens* Bl. It was found that the reference of this species to *Ptychopyxis* was in fact erroneous, and that it actually belonged in the genus *Koilodepas* (*Coelodepas*) Hassk. Before its place in this genus could be properly assessed, it was necessary to review all the described species rather carefully, and certain adjustments were found to be needed. These are set out in the following pages, with a tentative key to the species—some of which are undoubtedly critical. The reasons for restoring the original spelling—*Koilodepas*—of the generic name are also stated.

The genus comprises some 10 species of shrubs or small trees, occurring principally in the Western Malaysian region (Malay Peninsula, Sumatra, W. Java, Borneo), but with two slightly aberrant outliers in S. India and Hainan. It is often noted by collectors that the wood is very hard, but the small size of the boles would mostly preclude its being of commercial importance. The genus occupies an isolated position in the family, though there is possibly some relationship with *Epiprinus* Griff. and *Symphyllia* Baill.; the foliage is somewhat reminiscent of *Erismanthus obliquus* Wall. ex Muell. Arg., and there is more than a hint of *Flacourtiaceae*, such as *Hydnocarpus*.

Two sections may be recognised in the genus, based on the nature of the fruiting calyx: this separates the above-mentioned outlying species from the more typical remainder.

Sect. **Hyalodepas** *Airy Shaw*, sect. nov., calyce sub fructu foliaceo membranaceo late lobato valde accrescente.—Typus: *K. calycinum* Bedd. (S. India).

Sect. **Koilodepas**, calyce sub fructu vel immutato vel segmentis elongatis anguste linearibus.—Typus: *K. bantamense* Hassk. (SE. Sumatra, W. Java).

Key to species

Fruiting calyx greatly enlarged, membranous, broadly and irregularly lobed (Sect. Hyalodepas Airy Shaw):
- Leaves 4–16 cm. long, drying green (S. India) . . . . . 1. **calycinum**
- Leaves 6–21 cm. long, drying purplish brown (Hainan) . . . . . 2. **hainanense**

Fruiting calyx almost unchanged, or segments linear, elongate (Sect. Koilodepas):
- Calyx of ♀ flowers bearing conspicuous black discoid glands at flowering time; leaves drying purplish brown (Sumatra, Java) . . . . . 3. **battamense**
- Calyx of ♀ flowers without visible glands at flowering time (but sometimes showing such glands at fruiting stage):
  - Stigmas at flowering time forming a dense, hemispherical or disciform mass, without clearly distinguishable style-branches; leaves small (up to 10 cm. long), entire, rather thin, thinly stellate-puberulent below; branches strongly tomentellous; inflorescences (?always) very short, under 2 cm. (Malay Peninsula) 4. **ferrugineum**
  - Stigmas at flowering time not as above, style-branches usually clearly distinguishable:
    - Fruiting calyx with long (1 cm.), linear segments, bearing conspicuous black discoid glands on the back; leaves up to 30 × 8·5 cm., mostly drying light brown (not purplish), nervation rather strong (E. Borneo) . . . . 9. **stenosepalum**
    - Fruiting calyx almost unchanged, with deltoid or shortly subulate segments:
      - Leaves entire, or rarely with an obscure blunt tooth here and there:
        - Leaves drying chestnut-brown or greenish; stigmas subsimple; nervation lax; leaves cuneate to rounded at base (N. Borneo) 7. **longifolium** var. **integrifolium**
        - Leaves drying purplish-brown; stigmas branched:
          - Inflorescence distinctly canescent-tomentellous; venation lax, primary nerves 1·5–2 cm. apart (measured along midrib), spreading widely from midrib and curving strongly forwards; leaves subcordate at base (Malay Peninsula) . . . . . 6. **wallichianum**
          - Inflorescence fulvous, not canescent; venation closer, primary nerves 1–1·5 cm. apart, ascending rather steeply from midrib and only slightly curved; leaves broadly cuneate to rounded at base (SE. Borneo) 5. **frutescens**
      - Leaves evidently crenate-serrate, at least in distal half:
        - Inflorescence distinctly canescent-tomentellous; ♂ glomerules of rather few (3–6), relatively large (1·5–2 mm) flowers, with 6–8 stamens and a large truncate pistillode; leaves subcordate at base, drying purplish-brown (Malay Peninsula) . . . . . 6. **wallichainum**
        - Inflorescence not distinctly canescent, usually fulvous or ferrugineous; ♂ glomerules of more numerous (10–20), smaller (1 mm.) flowers, with 4–6 stamens and a much less conspicuous pistillode:
          - Petioles usually about 1 cm. long; leaves slightly more coriaceous; ♀ calyx (at flowering stage) scarcely or obscurely lobed, sometimes bearing dorsal glands at fruiting stage (Malay Peninsula, Banka, N. Borneo) 7. **longifolium**
          - Petioles about 5 mm. long; leaves slightly thinner in texture; ♀ calyx deeply lobed, lobes subulate; glands not observed (N. Borneo) . 8. **brevipes**

Sect. *Hyalodepas*

1. **Koilodepas calycinum** *Beddome*, Fl. Sylvat. S. Ind. **2**(27), t. 320, Forester's Man. p. ccvii (1873); Hook.f. in Hook.f., Fl. Brit. Ind. **5**, 419 (1887); Brandis, Ind. Trees, 586 (1906); Bourdillon, For. Trees Travanc. 345 (1908); Pax & K. Hoffm. in Engl., Pflanzenr. IV. **147**, vii, 270 (1914); Gamble, Fl. Madras **2**, 1324 (1925).

S. India.

This species and *K. hainanense* (Merr.) Croizat differ conspicuously from all the remainder in their membranous accrescent fruiting calyces. It is noteworthy that they occur in marginal areas, relatively to the main bulk of the genus.

2. **Koilodepas hainanense** (*Merr.*) *Croizat* in Journ. Arn. Arb. **23**, 51 (1942) (excl. syn. *Nephrostylo poilanei* Gagnep.).

Calpigyne hainanensis Merr. in Journ. Arn. Arb. **6**, 135 (1925) et in Lingnan Sci. Journ. **5**, 111 (1927).

Since the original collections of W. Y. Chun in 1920, the species has been obtained on several other occasions. It may be worth placing on record those of which duplicates are present in the Kew Herbarium.

Hainan. Taam Chau Distr.: Shui Mei Shan, 25 May 1928, *W. T. Tsang* 494 (Lingnan Univ. no. 17243): 'Growing on dry ground beside a ravine; fr. gray.' Taam Chau Distr.: Sha Po Shan, 24 April 1929, *Tsang, Tang & Fung* 14 (Lingnan Univ. no. 17545): 'On top of the 3rd peak of the mountain. Height 2½ m. Fl. purple.' Ching Mai Distr.: Tai Wong Ling and vicinity, Tung Pin Tin village, 14 April 1933, *C. I. Lei* 536: 'Fairly common; dry gentle slope, sandy soil, rocky forest; woody, erect; 3 m. high, 6 cm. diam.; fruit.'—Vernacular name: *paak ch'a* (or *tsa*) *shue*.

The fruit and fruiting calyx were unknown to Merrill in 1925. A description of these, based upon *Tsang* 494, is supplied herewith.

Calyx sub fructu valde accrescens, membranaceus, brunneus, usque 1·5 cm. longus vel ultra, ultra dimidiam partem irregulariter 6–7-lobus, longitudinaliter nervosus, nervis majoribus conspicue insculptis, basi intus et extra stellato-tomentellus. *Capsula* (ex unica matura visa) didyma, 1·7 cm. diametro, 1·2 cm. longa, dense brevissime fulvo-tomentella.

The capsule is probably normally tricoccous. Merrill makes no mention of the number of loculi in the ovary in his original description.

I believe Croizat's reference of *Nephrostylus poilanei* Gagnep. to this species to be erroneous: see under *K. longifolium* Hook.f. (*infra*, p. 388).

K. hainanense is probably scarcely specifically distinct from *K. calycinum* Bedd., but a greater range of material is needed to decide this point.

Sect. *Koilodepas*

3. **Koilodepas bantamense** *Hassk.* in Versl. en Meded. Koninkl. Akad. Wetensch. (Amsterdam), Afdeel. Natuurk. **4**(1), 140 (1855), et in Mohl & Schlechtendal, Bot. Zeit. (Leipzig) **14**, 802 (1856), et (sub *Coelodepas*) in Flora **40**, 531 (1857), et Hort. Bog. Descr., s. Retziae ed. nov. valde auct. et emend., pars 1, 45 (1858); Miq. Fl. Ind. Bat. **1**(2), 398 (1858); Muell. Arg. in DC. Prodr. **15**(2), 759 (1866); Boerl. Handl. Fl. Ned. Ind. **3** (1), 286 (1900); J. J. Smith in Meded. Depart. Landb. **10**, 380 (1910); Koord. Exkursionsfl. Java **2**, 489 (1912); Pax & K. Hoffm. in Engl., Pflanzenr. IV. **147**, vii, 269, fig. 42 A–C (1914); S. Moore in Journ. Bot. **63**, Suppl. 97 (1925); Pax & K. Hoffm. in Engl. & Harms, Nat. Pflanzenfam., ed. 2, **19c**, 125 (1931); (sub *Koilodepas*, c. adnot. de orthogr.) Meeuse & Adelbert in Backer, Beknopte Fl. Java IVC, 95 (1943).

SE. Sumatra; W. Java; see Pax & Hoffmann (1914).

In the only flowering specimen preserved in the Kew Herbarium (from a plant cultivated in the Bogor Gardens), the ♀ calyces bear a ring of 6–8 very conspicuous round black glands externally towards the base. It is remarkable that J. J. Smith makes no reference to these in his very detailed description of the species (1910), although the label of this specimen bears the legend: 'det. J.J.S. 1907'. Hasskarl, however, noted them in his detailed description of 1858.

4. **Koilodepas ferrugineum** *Hook. f.* in Hook. f., Fl. Brit. Ind. **5**, 420 (1887); Pax & K. Hoffm. in Engl., Pflanzenr. IV. **147**, vii, 269 (1914); Ridl., Fl. Mal. Penins. **3**, 276 (1924).

Malacca. Without further particulars, *Griffith* (Kew distrib.) 5017.

This species appears never to have been collected again. Judging from the single known gathering, it should be rather distinct in its small, rather thin, entire leaves, which are thinly stellate-puberulent on the lower surface (and also on the upper surface towards the base), and dry a purplish colour. The 'densely branched coralliform [sphalm. 'corolliform'] stigmas' were commented on by J. D. Hooker: in no other species do they appear to form such an indistinguishable mass.

5. **Koilodepas frutescens** (*Bl.*) *Airy Shaw*, comb. nov.

Calpigyne frutescens Bl. Mus. Bot. Lugd.-Bat. **2**, 193 (1856); Muell. Arg. in DC., Prodr. **15**(2), 1255 (1866); Pax & K. Hoffm. in Engl., Pflanzenr. IV. **147**, vii, 255 (1914) et xiv, 35 (1919); Merr. in Journ. As. Soc. Str. Br. **1921**, Spec. No. 343 (1921).

Ptychopyxis frutescens Croizat in Journ. Arn. Arb. **23**, 49 (1942), *pro nom. nov.*

SE. Indonesian Borneo. Bandjermasin Div.: G. Pamatton, 22 Oct. 1836, *Korthals*: 'Heester van 10 Voet.'

In a genus of somewhat nebulous 'species', *K. frutescens* is perhaps nearest to *K. ferrugineum* Hook.f., with which it agrees in its comparatively small, subentire leaves, which dry a dark purplish brown, and (possibly) in the possession of a rather short ♂ portion of the inflorescence, though the state of the available material in both species makes it difficult to speak positively about this. The leaves of *frutescens*, however, are almost glabrous beneath, and the stigmas are clearly triradiate; whereas in *ferrugineum* the leaves are thinly stellate-pubescent beneath, and the stigmas form a dense coralliform mass in which the three branches are indistinguishable except by dissection. Neither *K. frutescens* nor *K. ferrugineum* seems ever to have been collected again.

Koiledepas frutescens becomes the second species to be recorded from the island of Borneo, the first having been *K. brevipes* Merr. (in Philipp. Journ. Sci. **30**, 80: 1926), from North Borneo, where it has been collected a number of times. A third species, from East (Indonesian) Borneo (roughly midway between the areas of *K. frutescens* and *K. brevipes*), is described below, as well as a further form, of somewhat uncertain status, from North Borneo, provisionally given varietal rank under an already known species.

Note on *Calpigyne* Bl.

As mentioned in the introduction, in an attempt to clarify the status of some of the forms referred by Croizat (in Journ. Arn. Arb. **23**, 47–51: 1942) to the genus *Ptychopyxis* Miq., I was able to borrow from the Leiden Herbarium, by the courtesy of the Director, the ample type material of *Calpigyne frutescens* Bl. Although there is perhaps a superficial similarity between *C. frutescens* and some species of *Ptychopyxis*, Blume's species is undoubtedly referable to the genus *Koilodepas* Hassk. The type material bears very young infructescences, from which the terminal male portion, typical of *Koilodepas*, has evidently fallen, as often happens in this genus. The stub of the broken-off axis is, however, clearly visible in several places.

Blume's description of the male flowers (evidently drawn up when some still remained on the material) is, as Croizat points out, clearly inapplicable to *Ptychopyxis*; but it is perfectly correct for *Koilodepas*. An interesting confirmation of this is the fact that Merrill actually referred his *Calpigyne hainanensis* (in Journ. Arn. Arb. **6**, 135: 1925) to Blume's genus from description only—though it is strange how he missed the much better known *Koilodepas*.

Croizat's contention that the generic name *Calpigyne* Bl. should be treated as a *nomen confusum* thus falls to the ground.

Dr. van Steenis has drawn my attention to a note published by Hasskarl in Bull. Soc. Bot. France **6**, 713–714 (1860), in which he gives the differences of *Calpigyne* from *Coelodepas* (sic!) as: 'filamentis brevibus lato-subulatis, carnosis, basi connatis [*sphalm.* 'cornutis'], stylis brevissimis, stigmatibus 3 magnis patentissimis bifidis eroso-laceratis (nec 'tres-divisées' Baill.).' This is extracted almost word for word from Blume's original description, and suggests that he never saw the type material.

Boerlage, in his Handl. Fl. Ned. Ind. **3**(1), 196, 242–4, 286–7 (1900), significantly placed *Calpigyne* immediately after *Coelodepas*, giving what he regarded as the salient characters in the following synoptical diagnoses (translated) (p. 196):

'47. Coelodepas. Stamens 4–5; filaments stoutly cuneiform, connate; anthers pendulous or divaricate. Rudimentary ovary in the male flower small. Styles spreading, flattened, bifid.—Glabrous trees with penninerved leaves. Male spikes long, in the monoecious species with female flowers at the base; female flowers in the dioecious species in short spikes.

'48. Calpigyne. Stamens 4, with short filaments, connate in the centre of the flower, and dorsifixed introrse anthers. Rudimentary ovary wanting. Styles shortly connate at the base, bifid and divided irregularly into laciniae. —Shrub; young parts stellate-pubescent. Flowers monoecious, in axillary and terminal, filiform spikes; male flowers collected into glomerules along the axis of the spike.'

It is evident that Boerlage was unable to find any clearly contrasting characters.

Koilodepas versus Coelodepas

Since the generic names *Calpigyne* Bl. and *Coelodepas* Hassk. were published within a short time of each other, it has been necessary to make some en-

quiries into actual dates, particularly with reference to the date of publication of *Koilodepas* Hassk., the form in which Hasskarl's generic name first saw the light (*cf.* Croizat, *l.c.* 50). Through the kind offices of Dr. C. G. G. J. van Steenis and Dr. W. T. Stearn, to whom I here express my best thanks, it has been possible to establish that *Koilodepas*, with the sole species *K. bantamense* Hassk. (descriptio generico-specifica), was published in the Verslagen en Mededeelingen der Koninkl. Akademie van Wetenschappen, Afdeeling Natuurkunde, **4**, part 1, in November 1855. I do not know upon what grounds Croizat stated (*l.c.*) that it was published in 1856. [A transcript of the article appeared, under 'Literatur', in Mohl & Schlechtendal's Bot. Zeit. (Leipzig), **14**, 802 (Nov. 1856).] *Calpigyne* Bl. was included in Blume's Museum Botanicum Lugduno-Batavum **2**, No. 13, which, though dated 'Kal. Martii 1856' (p. 208), was actually issued in May of that year: see Beumée in Fl. Mal. Bull. **1** (3), 69–70 (1948); Fl. Mal., ser. I, **4** (5), clxxii (1954). The amended spelling *Coelodepas* Hassk. (Flora **40**, 531) was not published until September 1857.

Thus, as Croizat says, 'the validity and priority of the spelling *Koilodepas* over *Coelodepas* in unquestionable.' In view, however, of the smallness (± 10 spp.) and comparative unimportance of the genus, I feel (*pace* Croizat!) that conservation of the later spelling is scarcely justified, and Dr. van Steenis agrees with me in this. I therefore adopt in this paper the original spelling *Koilodepas*. As van Steenis points out (*in litt.*), 'no new combinations are needed, since it is a matter of orthography.' It should be understood that wherever I have attributed a species of '*Koilodepas*' to any author (except in Hasskarl's original publication, and in Backer's Beknopte Flora van Java), the original spelling actually employed was *Coelodepas*, or occasionally, by error, *Caelodepas*.

6. **Koilodepas wallichianum** *Benth.* in Hook., Ic. Plant. **13**, t. 1288 (1879); Hook. f. in Hook.f., Fl. Brit. Ind. **5**, 419 (1887); Pax & K. Hoffm. in Engl., Pflanzenr. IV. **147**, VII, 269 (1914); Ridl., Fl. Mal. Penins. **3**, (1924) (specimine e Dindings, Pangkor, *Curtis*, excluso).

Coelodepas subcordatus [*sic*] Gage in Rec. Bot. Surv. Ind. **9**, 239 (1922), *pro parte*, excl. *Curtis* 1374; **synon. nov.**

PENANG. Hills, c. 1824, *Porter in Wallich* 9098 (type of *Coelod. wallichianum* Benth.): 'A small plant from the hills; flowers white.' Penara Bukit Reserve, 300 m., Oct. 1887, *Curtis* 1271 (lectotype of *Coelod. subcordatum* Gage): 'Tree. Wood very hard.'

The true *K. wallichianum* is apparently a local endemic confined, so far as is known, to Penang. It is quite distinct in its few-(3–6-)flowered glomerules of relatively large ♂ flowers, with rather numerous (6–8) stamens and large truncate pistillode. The calyx is very white-hoary. The leaves are either entire or distinctly toothed.

Gage cited two specimens for his *C. subcordatum*, one from Penang (*Curtis* 1271) and one from Dindings, Perak (*Curtis* 1374), without indicating either as the type. From his diagnosis ('laminae basi subcordata staminibus 6–7 et pistillodio magno'), it is evident that he based his species principally upon the Penang specimen, which I therefore designate as LECTOTYPE. The Perak specimen is found to be the widespread species that has hitherto

been known either as *C. wallichianum* or as *C. glanduligerum* Pax & K. Hoffm., for which the correct name is *C. longifolium* Hook. f.; see next species.

7. **Koilodepas longifolium** *Hook. f.* in Hook. f., Fl. Brit. Ind. **5,** 420 (1887); Pax & K. Hoffm. in Engl., Pflanzenr. IV. **147,** VII, 270 (1914); Ridl., Fl. Mal. Penins. **3,** 275 (1924).

Coelodepas glanduligerum Pax & K. Hoffm. *l.c.*; Ridl. *l.c.*; **synon. nov.**

C. subcordatus [*sic*] Gage in Rec. Bot. Surv. Ind. **9,** 239 (1922), *pro parte*, quoad *Curtis* 1374.

Nephrostylus poilanei Gagnep. in Bull. Soc. Bot. France **72,** 467 (Aug. 1925), et in Lecomte, Fl. Gén. Indoch. **5,** 327 (Dec. 1925); **synon. nov.**

var. **longifolium**: foliis plerumque manifeste dentatis crebrius nervosis, stylis pro rata magis ramosis.

PERAK; MALACCA; SINGAPORE: numerous collections. (Type: *King's Collector* 6502, PERAK; see footnote, p. 389, *infra.*).

ANNAM. Phanrang Prov., *Poilane* 5694; Nhatrang, March 1911, *C. B. Robinson* 1469.

BANKA. G. Mangkol, granitic sand, ± 50 m., 15 Sept. 1949, *Kostermans & Anta* 717: 'Treelet 5 m.; fls. yellow.'

N. BORNEO. Sabah, Kalatuan, virgin forest, 6 m. alt., 30 July 1948, *Abdul Rahim* (*N. Borneo For. Dept.*) A 409: 'Tree 18 ft. high, 9 in. girth. Floccose, stellate indumentum present on under surface of parts of some leaves (? on young leaves). N.B. Laciniate stipules up to 7 mm. long. Flower yellow.' Vernacular name (Brunei Benuni): *kilas.* Kuala Belait distr., Andalau Forest Reserve, Compt. 6, 60 m. alt., 2 May 1957, *Wood, Smythies & Ashton* (*Sandakan Herb. No.*) 17558: 'Tree, height 30 ft.'

var. **integrifolium** *Airy Shaw*, var. nov., a var. *longifolio* foliis integerrimis nervatione laxiore stylis minus ramosis differt.

N. BORNEO. Bengkoka Kadas, hillside, 40 m., 27 April 1923 (♀ infl.), *Orolfo* (*B.N.B. For. Dept.*) 1821 (typus, Herb. Kew.): 'Tree, 30 ft., 4 ins. diam. Flower grey; fruit orange, very small. Wood white, hard.' Labuan, Forest Reserve, 9 m., 19 Sept. 1936 (young ♂ and ♀ fl.), *Apostol* (*N.B. For. Dept.*) 6282: 'Tree, 30 ft. high, 5 ins. girth. Flower whitish.' Talong Tongod For. Distr., Sagsikan For. Res., virgin forest on hillside, 60 m., 12 Dec. 1952 (ster.), *Bukoh* (*Sandakan Herb. No.*) A 3411: 'Tree, 30 ft., girth 1 ft.' Beaufort Distr., Beaufort Hill, 1 mile NE. of Beaufort township, 90 m., 6 Aug. 1955 (fruit), *Wood & Kapis bin Sisiron* (*Sand. Herb. No.*) 16834: 'Tree, height 20 ft.'

Vernacular names: *puti* (? *pati*) (Dusun Rongos); *kilas* (Bajau Lobok); *rongrongkoi* (Malay); *kelis-kelis* (Dusun Kinabatangan).

The following specimen is also possibly referable here:—

LOWER SIAM. Khoa Phoo, Trang, 100 m., 19 Feb. 1916, *Vanpruk* 824: 'Small tree'. Vernacular name: *mai chi mut.*

The status of var. *integrifolium* will require review when more ample material comes to hand. I was at first inclined to treat it as a distinct species,

but complete flowering material is lacking, and the characters given above are somewhat indefinite, although the entire leaves give the specimens a distinctive appearance. The specimen *Abdul Rahim* A409, however, cited above under var. *longifolium*, has very sparsely toothed leaves.

Koilodepas longifolium is evidently the most widespread species of the genus. In the literature it has been hitherto comprised under *K. wallichianum* auctt. (non Benth.) and *K. glanduligerum* Pax & K. Hoffm. But the true *K. wallichianum* Benth. is found to be a local endemic, apparently confined to Penang, whilst the residue of the '*K. wallichianum* auctt.' material only differs from *K. glanduligerum* Pax & K. Hoffm. in the absence of glands on the calyx; I have been unable to discover any other associated character. In view of the fact that both forms apparently grow together in the Gardens Jungle at Singapore, I believe that the glandular condition represents an individual variation, or perhaps stage, in one variable species. This species is now found to occur not only in several parts of the Peninsula, but also in the islands of Banka and Borneo. It is, I think, undoubtedly conspecific with the hitherto little-known *K. longifolium* Hook. f., described from a single somewhat inadequate collection from Perak*—the State from which the second specimen cited by Gage for his *K. subcordatum* also originated, and which is also referable to *K. longifolium*.

The most characteristic feature of *K. longifolium* appears to be its elongate inflorescence bearing many-(c. 20-)flowered glomerules of very minute ♂ flowers. The leaves show much variation, being most commonly very distinctly toothed, but sometimes subentire. As stated above, the presence or absence of glands on the ♀ calyx seems to be quite fortuitous. The abnormality in which the inflorescence is copiously branched and all parts of the flowers are transformed into bract-like structures, the whole being densely ferrugineous-tomentose, has been commented on by Pax & Hoffmann and by Ridley, *ll.cc.* (sub *K. glanduligero*).

As stated earlier, under *K. hainanense* (p. 384, *supra*), I believe that Croizat was in error in referring *Nephrostylus poilanei* Gagnep. to that species. From the original description, illustration, and a single gathering from the same region of Annam, I think *N. poilanei* is probably a form of *K. longifolium* with obscurely toothed leaves. A similar form (*Abdul Rahim* A409) has been obtained in North Borneo.

8. **Koilodepas brevipes** *Merr.* in Philipp. Journ. Sci. **30**, 80 (1926); Univ. Calif. Publ. Bot. **15**, 156 (1929)

N. Borneo. Tawao, 1922–23, *Elmer* 20821, 21512; Kalumpang, 1924, *Wood* 1291 (type) (*vide* Merrill, *ll.cc.*). Tiram River, plain, 2 m. alt., 19 Sept. 1933, *Maidin* (*N.B. For. Dept.*) 3667: 'Tree 10 ft. high, 7 in. girth; flower golden yellow.' Vernacular name (Malay and Suluk): *ulas*. Tawau distr., Kalabakan (30 miles WNW. of Tawau), Bombay Burmah Trading Co.'s Concession, Cpt. 5, Sub-cpt. 4, 180 m. alt., 24 Nov. 1954, *G. H. S. Wood* (*Sandakan Herb. No.*) A 4106: 'Tree, height 12 ft.'

* The field notes accompanying this specimen, not having previously been published, may be given here. 'Larut, dense jungle, rocky locality, 150–300 m., Aug. 1884, *King's Collector* 6502: 'A tree 20 to 30 ft. high. Stem 2 to 3 ins. in diameter. Leaves glossy dark green. Flower pale green with a silvery tinge.'

It is perhaps doubtful whether *K. brevipes* is more than a local variant of *K. longifolium* Hook.f. The distinctions given by Merrill—'thinner, differently shaped, slenderly and acutely acuminate leaves', and 'shorter petioles'—appear, however, on the whole to hold (except that I cannot find any essential difference in leaf-*shape*, apart from the longer acumen). The deeply divided ♀ calyx, to which Merrill also draws attention, is probably a significant point; in this feature *K. brevipes* agrees with the new species, *K. stenosepalum* Airy Shaw, described below. The ♂ flowers are generally slightly larger than those of *K. longifolium*.

9. **Koilodepas stenosepalum** *Airy Shaw*, sp. nov., *K. brevipedi* Merr. forsan affine, foliis usque 30 cm. longis paullo crassioribus glandulis fuscis disciformibus compluribus in poculis basalibus bullatis aggregatis, calycis segmentis sub fructu valde lineari-elongatis usque 1 cm. longis, in genere distinctum.

Frutex vel *arbuscula* 1–3 m. alta; ramuli graciles, 2–3 mm. crassi, primum angulati et parce fulvo-stellato-tomentelli, denique teretes et glabrescentes. *Folia* oblonga vel elliptica vel sublanceolata, 13–30 cm. longa, 2·5–8·5 cm. lata, basi rotundata vel leviter cordata (et in pocula bina quasi bullato-contracta), apice longiuscule (2–3 cm.) acuminata, acumine imo apice acuto vel apiculato, margine manifeste crenulato-serrata, chartacea, glabra, siccitate brunneo-viridia; costa gracilis, supra et subtus prominens, nervis lateralibus gracilibus 10–15-jugis utrinque prominulis, nervis minoribus transversis pulchre reticulatis; petiolus brevissimus, 3–5 mm. longus, 2 mm. crassus, dense stellato-tomentellus; stipulae conspicuae, subulato-filiformes, 5–9 mm. longae, acutissimae, parce minute serrulato-dentatae. *Inflorescentiae* 2–13 cm. longae, vel omnino ♂, glomerulos florum ♂ 5–8 gerentes, vel ♀, basi flores ♀ 1–2 gerentes, rhachi fulvo-stellato-tomentella. *Flos* ♂: *Calyx* cupularis, 1–1·5 mm. longus, dense tomentellus, breviter 5-lobus, lobis deltoïdeis. *Stamina* 3–6; filamenta in tubum infundibularem saepe longe exsertum connata, apice breviter libera, inaequilonga, longiora 2 mm. longa; antherae generis. *Flos* ♀: *Calyx* cupularis, 2 mm. longus, dense tomentellus, usque ad medium (quam ♂ altius) 5–7-lobus, lobis triangulari-subulatis acutis erectis. *Ovarium* subglobosum, dense tomentellum, 2–2·5 mm. diametro. *Stylus* elongatus, 1–2 mm. longus, tomentellus, in ramos 3 erecto-adscendentes 3–4 mm. longos divisus, stigmatibus iterum divisis et laciniato-papillosis. *Capsula* tricocca, 1·3 cm. lata, 0·8–1 cm. longa, dense breviter fulvo-tomentella, pedunculo crasso sulcato tomentello 4–5 mm. longo, calycis segmentis 5–7 anguste linearibus usque 1 cm. longis vix 1 mm. latis extra et intus parce stellato-tomentellis extra basin versus glandulis 2–4 conspicuis rotundis sessilibus fuscis notatis, seminibus 3 semiglobosis 6–7 mm. diametro laevibus brunneis ventre obtuse angulatis.

E. Borneo. Nunukan, N. of Tarakan, devastated *Dipterocarpaceae*-forest, from old forest-garden to bivouac 1, S. of kampong, low alt., Nov. 1953, *W. Meijer* 1913: 'Treelet 2 m., 2 cm. diam.; flower yellow-green. Dimensions of leaves very variable on this treelet!!' Bulungan, Sebakis R. region, sandy ridge, 9 Jan. 1954, *Kostermans* 9317: 'Shrub 1 m. Fls. white.' Central Kutei, Belajan R., near Long Bleh, sandy loam, low alt., 31 March

1955, *Kostermans* 10326: 'Treelet 3 m. tall. Fls. yellowish.' Belajan R., Gunung Sahari, forest, under 100 m., 16 Aug. 1956, *L. L. Forman* 442 (type): 'Tree 2 m. high. Fruit gold-brown.' Vernacular name (Belajan R.): *kayu gading*. Berouw, Mapulu, at foot of Mt. Ilas Mapulu, sandstone soil, common on dry ridges, 300 m., 19 Sept. 1957, *Kostermans* 13949: 'Treelet 3 m. Fls. white, fragrant (lemon).' Vernacular name: *kayu gading*.

But for Mr. L. L. Forman's fortunate collection of fruiting material, it is possible that the above flowering specimens might long have remained unrecognised as representing an undescribed species. The discovery gives point to Croizat's observation (l.c. 51): 'One of the characters of *Coelodepas* that will bear closer study is the degree of accrescence of the ♀ calyx.' The only two species in which a marked accrescence of the calyx in fruit has hitherto been known to occur are *K. calycinum* Bedd. (S. India) and *K. hainanense* (Merr.) Croizat (Hainan). In these, however, the calyx enlarges into a large, membranous structure, with broad, shallow lobes, entirely unlike the long narrow segments of the present species.

K. stenosepalum is probably nearest to *K. brevipes*, with which (as already noted) it appears to agree significantly in its deeply lobed ♀ calyx. The leaves are somewhat thicker in texture than in *brevipes*, and the nervation slightly stronger. The much exserted staminal tube of the ♂ flowers is noteworthy. The most distinctive feature of the species lies, however, undoubtedly in the elongate, linear segments of the fruiting calyx, which bear conspicuous disciform glands on the back, although, curiously enough, in the flowering stage, no sign of these glands appears to be visible.

Species excludenda

'Coelodepas' hosei *Merrill*. In describing this Bornean plant, Merrill stated (Philipp. Journ. Sci., Bot., **11**, 66: 1916) that it was 'apparently closely allied to *Coelodepas wallichiana* Benth.' Examination of the type collection, however, shows that it is the female plant of a typical **Claoxylon.** I have not matched it with any described species. It is not possible to run it down by means of Pax & Hoffmann's key (Engl., Pflanzenreich IV. **147**, VII, 100–104: 1914) since that is based almost exclusively upon male plants. The texture and venation of the leaves are rather similar to those of *C. ellipticum* Merr., from the Philippines, though in shape they are proportionately longer and narrower. *C. ellipticum* further differs in the rather conspicuous indumentum of the stems, *C. hosei* being, apart from the inflorescence, almost glabrous.

The requisite transfer is made below.

Claoxylon hosei (*Merr.*) *Airy Shaw*, comb. nov.

Coelodepas hosei Merr. in Philipp. Journ. Sci., Bot., **11**, 66 (1916), et in Journ. Str. Br. Roy. As. Soc., **1921**, Spec. No. 338 (1921).

Borneo. Sarawak: Baram district, Entoyut river, 13 Nov. 1894, *Hose* 465.

XII. THE TAXONOMIC POSITION OF OLIGOCERAS GAGNEP.

(P. & H. 207–208)

The monotypic genus *Oligoceras* was established by Gagnepain (in Bull. Soc. Bot. France **71**, 872: 1924) for a glabrous Annamese tree with long-petioled, triangular-ovate leaves, conspicuously biglandular at the apex of the petiole, and large terminal thyrses of small but conspicuously petaliferous flowers. The author noted that in the classification adopted by Mueller-Arg. in De Candolle's 'Prodromus', the genus would come near *Givotia*, *Paracroton* (= *Ostodes*), and *Jatropha*; but, in that proposed by Pax & Hoffmann, somewhere in the subtribe *Galeariinae*. In their synopsis of the family in the second edition of the 'Pflanzenfamilien', however, Pax & Hoffmann included *Oligoceras* in their tribe *Chrozophoreae*, group (? subtribe) *Regulares*, next to the genus *Deutzianthus* Gagnep.

This last fact is of some interest, since it was pointed out in my note on *Deutzianthus* (*supra*, p. 363) that the position of that genus in Pax & Hoffmann's key was largely dependent on the interpretation of the sepal-aestivation, and the same holds true for *Oligoceras*. Gagnepain described the calyx-lobes as 'subvalvate', but examination of his type-material shows that this is not correct, and that they are rather 'subimbricate', and indeed sometimes quite distinctly imbricate at the base. This immediately brings *Oligoceras* in Pax & Hoffmann's key into the tribe *Cluytieae**, and this I believe to be the true position of this genus. It is less easy to assign it to a subtribe—in Pax & Hoffmann's scheme it would probably require a special one to itself—but on general grounds I would place it near *Trigonostemon*, having especially in mind such species as *T. paniculatum* Merr. (Sect. *Pycnanthera* Benth.), characterized by a large terminal thyrsoid inflorescence.

The general habit-similarity between *Oligoceras*, *Deutzianthus* and *Aleurites* (already noted, in the case of the last two, by Gagnepain, *l.c.* 140) is quite striking, since the combination of long-petioled, broadly ovate leaves, biglandular at the apex of the petiole, with a large terminal thyrse of petaliferous flowers, is of infrequent occurrence in the *Euphorbiaceae*. It may probably be regarded as representing a relatively generalised type from which other genera have been differentiated. It is of interest that *Deutzianthus* has relatives with digitate leaves, since this is a character likewise often associated with comparatively unspecialised types of plant.

XIII. THE GENUS SYNDYOPHYLLUM IN SUMATRA AND BORNEO

(P. & H. 213)

The genus *Syndyophyllum* K. Schum. & Lauterb. (Fl. Deutsch. Schutzgeb. Südsee 403, t. 12: 1901) was described, with two included species,† from New Guinea, and, so far as I know, has not yet been recorded from any other region of Malaysia. It seems worth while, therefore, to place on record the

* The genera *Erismanthus* Wall. and *Moultoniantha* Merr., and the completely heterogeneous subtribe *Galeariinae*, included by Pax and Hoffmann in the tribe *Cluytieae*, must certainly be excluded from this tribe.

† The second species, *S. trinervium* K. Sch. & Laut., was excluded from the genus and transferred to *Coelodiscus* (= *Mallotus*) by Pax in Fedde, Rep. Sp. Nov. **8**, 481 (1910).

following Sumatran and Bornean gatherings. In spite of certain small differences, I believe them to represent the same species as that originally described; this, however, must be checked when more ample material becomes available.

Syndyophyllum excelsum *K. Schum. & Lauterb.*, l.c.; Pax & K. Hoffm. in Engl., Pflanzenr. IV. **147**, III, 104 (1911), et in Engl. & Harms, Pflanzenfam., ed. 2, **19c**, 172 (1931); (genus) Lam in Blumea **1**, 129 (1934).

Sumatra. E. Coast: Sultanate of Asahan, Pargambiran*, 16–21 Nov. 1933 (fr.), *Rahmat Si Boeea* 6302: 'Tree'.

Sarawak. Lundu, open forest near streams, Oct. 1929, *J. & M. S. Clemens* 22235: 'Tree, 30-40 ft.' [9–12 m.].

N. Borneo. Banggi (Banguey) Island, R. Pangkalan, April 1885, *Dr. M. Fraser* 262. *Ibid.*, July–Sept. 1923, *Castro & Melegrito* 1615. Lahad Datu distr.: 7 miles N. of Bakapit, Kennedy Bay Timber Co. Concession, 15 miles E.S.E. of Lahad Datu, 30 m. alt., 20 March 1955, *G. H. S. Wood* (Sandakan Herb. No.) 16098: 'Tree, height 70 ft.' [21 m.].

The following additional records from New Guinea may be cited here.

NW. (Dutch) New Guinea. Oransbari, Res. Ransiki, steep, swampy, young primary forest on stony clay, scattered, rather common, 30 Sept. 1955, *Koster* bw.1142: 'Young tree, bole 16 m. high, 32 cm. diam.; without buttresses, stilt-roots or pneumatophores; without fissures, not twisted, with many small knots; crown sparse, spreading, green'. Vernacular name (Manikiong): *siekoe*. Oransbari, Res. Menokwari, 50 m. alt., 12 Oct. 1955, *R. P. Mangold* bw.2114: 'Flower-buds brown'. Warsamson River, ± 25 km. E. of Sorong, primary forest on stony, clayey soil, ± 60 m. alt., 19 Aug. 1957, *F. Schram* bw. 2908: 'Rather scarce. Tree 18 m., bole 6 m. high, 38 cm. diam. at breast height. Bark dark brown, strongly flaking. Wood orange-yellow.' Vernacular name (Mooi): *kloesaoe*.

One of the above-cited specimens from North Borneo (*Castro & Melegrito* 1615) bears ripe fruits, which, since the fruits of *Syndyophyllum* have hitherto been unknown, may be thus briefly described:

Capsula depresse globosa, circiter 1·3 cm. diametro et 0·7 cm. alta, tenuiter sed firme lignosa, in segmenta 6 complete secedens, epicarpio laevi aureo-velutino. *Semina* globosa, 7–9 mm. diametro, testa laevissima pallide usque saturate brunnea nonnunquam marmorata.

The branching in this genus, and the origin of the inflorescences, is peculiar; it is strange that neither Schumann & Lauterbach, the original authors, nor Pax & Hoffmann in their later treatments, have commented upon it. The fact, however, that the latter, in their account for the 'Pflanzenfamilien' (1931), refer to the inflorescence as 'terminal' in their key (p. 41) and as 'axillary' in their brief generic description (p. 172) does at least give a hint of some difficulty.

The leaves appear to be strictly opposite, and are described by the authors as stipulate. It is true that large subulate structures, almost equalling the petioles in length, are present at the nodes, but the strange thing is that they

* For information on this region of Sumatra, see Bartlett in Nat. & Appl. Sci. Bull. Univ. Philipp. **4**, 243, 308 (1935).

appear to be associated with only *one* leaf of each pair. The other leaf is thus apparently exstipulate! I believe that these structures are not stipules, but prophylls or perulae, for they usually have a number of other similar ones associated with them, forming a kind of loose tuft or gemma. A scar that is usually present at their base may perhaps represent the scar of a fallen stipule.

At each node, in addition to the pair of leaves and tuft of perulae, there are usually two branches, or a branch and an inflorescence, or even a branch and two inflorescences, but it is not easy to determine exactly what arises in the axil of what. Evidently some kind of complex sympodium is involved, which could perhaps only be elucidated by examination of the living tree in the field, or of good spirit material. The following suggestion is put forward tentatively.

Each pair of opposite leaves is immediately succeeded by a pair of very reduced 'peruliform' leaves, decussate with them. The internode is, for practical purposes, entirely suppressed. In the axils of the normal leaves arise (perhaps serially) one or more inflorescences; in the axils of the decussate 'bract-leaves' arise further perulae, and from among these ultimately a branch may develop. The true apex of each 'branch' is presumably either completely suppressed, or concealed among further perulae not immediately distinguishable from the axillary tufts.

The genus *Syndyophyllum* appears to be taxonomically a somewhat isolated one. Pax & Hoffmann associate it with *Galearia*, *Microdesmis* and *Pogonophora*, in the *Cluytieae–Galeariinae*, but in general appearance (except perhaps for the elongate inflorescence of *Galearia*) it differs from these genera *toto caelo*. Schumann and Lauterbach's suggestion of an affinity with *Trigonostemon* is possibly better. I believe that its closest ally is actually to be found in the monotypic genus *Moultonianthus* Merr. [*M. borneensis* Merr. = *M. leembruggianus* (Boerl. & Koord.) v. Steen.], of Sumatra and Borneo. This appears to have an essentially similar system of branching, with opposite leaves of similar shape, toothing, nervation and consistency, the alternate pairs in this case being reduced to a pair of conspicuous ovate-cordate structures at the base of the normal ones. Most authors (including van Steenis in Bull. Bot. Gard. Buitenz. ser. 3, **17**, 404–5: 1948) have regarded these structures as interpetiolar stipules, but I believe that the explanation here put forward may be the correct one. The same probably holds good for *Erismanthus* (in which *Moultonianthus leembruggianus* was originally described), and the three genera would appear to form a closely-knit group, connected perhaps with *Mallotus* through species such as *M. miquelianus* (Scheff.) Pax & K. Hoffm. The latter authors scatter them at random through their tribe *Cluytieae*, which seems a very unhelpful treatment.

These are, of course, considerable differences of floral structure between *Syndyophyllum* and *Moultonianthus*. The latter has, for example, very long-pedicelled female flowers with large conspicuous petals, and quite conspicuous petals in the males also; and in the male flowers there is a staminal column. But the striking agreement in vegetative characters would seem to indicate that these floral differences should be regarded as secondary.

XIV. A NOTE ON ENDOSPERMUM

(P. & H. 234)

Endospermum diadenum (*Miq.*) *Airy Shaw*, comb. nov.

Melanolepis? diadena Miq., Fl. Ind. Bat., Suppl. (Fl. Sumatra) 455 (1860).

Mallotus diadenus (Miq.) Muell. Arg. in DC., Prodr. **15**(2), 959 (1866); Pax in Engl., Pflanzenr. IV. **147**, VII, 206 (1914), *in adnot.*

Rottlera diadena (Miq.) Scheff. in Miq., Ann. Mus. Bot. Lugd.-Bat. **4**, 125 (1868–9).

Endospermum chinense?—Hook. f. in Hook. f., Fl. Brit. Ind. **5**, 458 (1887); Ridl., Fl. Mal. Penins. **3**, 306 (1924).

Endospermum chinense var. *malayanum* Pax & K. Hoffm. in Engl., Pflanzenr. IV. **147**, IV, 36 (1912), *pro parte*, *typo* (*Forbes* 2779) *excluso*!; Merr. in Contrib. Arn. Arb. **8**, 90 (1934), *in obs.*

Endospermum malayanum [(Pax & K. Hoffm.)] Chatterjee in Kew Bull. **4**, 564 (1950).

SELANGOR. Kuala Lumpur, Damansara road, Dec. 1920, *Ridley s.n.*: 'Tree, flowers yellow'.

JOHORE. Sungei Pendas, 14 Feb. 1937, *Corner (Singapore Field No.)* 32255. *Ibid.*, 29 Sept. 19—, *Corner (Sing. Fld. No.)* 29965: '40 ft. tree in *blukar* on a hillock'.

SINGAPORE. Sept. 1822, *Wallich* 7846: 'Euphorbiac., fol. mire glandulosa'.

SUMATRA. Palembang, Lubu-alang, Ogan ulu, June 1857, *Teysmann s.n.* (type of *Melanolepis ? diadena* Miq.).

As noted by Pax (*l.c. supra*, under *Mallotus diadenus*), *Melanolepis diadena* Miq. is undoubtedly an *Endospermum*, in the affinity of *E. chinense* Benth. The only specimens that I have seen which match it reasonably closely are those from Selangor, Johore and Singapore, cited above. Chatterjee (*l.c.*) regards others from Perak and Selangor as the same, but these lack the soft, lax pubescence of *diadenum*. It is, however, quite possible that the character of the pubescence is due to youth; it is noteworthy that three of the above gatherings (*Teysmann*, *Wallich*, *Corner* 32255) are sterile. It should not be too difficult to establish the status of this pubescent plant by means of investigation in the field. A comparable condition seems to be represented by two specimens in Herb. Kew. labelled 'Assam, *Masters*'. The Bengal, Assam and Burma *Endospermum* populations are currently referred to *E. chinense* Benth. (see Cowan & Cowan, Trees N. Bengal 119 (1929); Kanjilal, De & Das, Fl. Assam **4**, 204 (1940); Chatterjee, *l.c.* 563), and the Burmese material at Kew certainly appears to be correctly so named.

As regards the presence or absence of glands at the apex of the petiole and at the bifurcations of the veins on the lower leaf-surface, this seems to be a very variable feature, apparently uncorrelated with any other. I strongly suspect that *E. diadenum* may actually represent an extreme, perhaps juvenile, form of *E. malaccense* Muell. Arg. This is, in fact, the view expressed by Ridley (*l.c.*) regarding the *Wallich* specimen (*cf.* also Merrill, *l.c.*). Pax and Hoffmann have introduced some confusion in this matter by placing *E. malaccense* in their key (*l.c.* 34) under the heading: 'Folia subtus eglandulosa'. The type material (*Griffith* [Kew Distrib. No.] 4721) preserved in the Kew Herbarium shows the presence, at a very few nerve-junctions, of a small, flattened, peltate gland.

Examination of the series of specimens of *diadenum*, '*malaccense*' and '*malayanum*' preserved at Kew shows that almost all possible combinations of indumentum and gland-development are present. This can be expressed in the form of the following key.

Densely and minutely grey-stellate-tomentellous:
Glands entirely absent . . . . . **'malaccense'** *sensu* Pax & Hoffm.
Glands present at least at a few nerve-junctions:
Glands absent at apex of petiole . . . . . **malaccense** Muell. Arg., *s. str.*
Glands present at apex of petiole . . . . . **malayanum** Chatterjee

Softly (sometimes sparsely) yellowish or whitish pubescent (lower leaf-surface appearing brownish); glands present at most nerve-junctions:
Glands absent at apex of petiole . . . . . Selangor, *Ridley s.n.*
Glands present at apex of petiole . . . . . **diadenum** (Miq.) Airy Shaw

Meanwhile Miquel's specific epithet clearly antedates any possible competitor, and will therefore eventually certainly be required. *Endospermum banghamii* Merr. (*l.c. supra*), apparently the only other form recorded from Sumatra, is almost certainly distinct. I strongly suspect that it will ultimately be found that *E. diadenum* and *E. malayanum* are only forms of *E. malaccense* Muell. Arg., in which case Miquel's epithet will provide the name for the aggregate.

Species excludenda

Endospermum perakense *King ex Hook. f.* in Hook. f., Fl. Brit. Ind. **5**, 458 (1887); Ridl., Fl. Mal. Penins. **3**, 306 (1924) = **Macaranga** sp.! (non *M. perakensis* Hook. f., *l.c.* 447 = *M. denticulata* Muell. Arg., teste Ridl., *l.c.* 303).

From the single sheet of the type collection (*King's Collector* 5267) preserved at Kew, I have not succeeded in matching this species with any other. The leaves are ovate, mostly cordate (rarely rounded, never peltate) at the base; the infructescences are simply racemose; and the young fruits are smooth and dicoccous. The venation of the leaves would probably be reckoned as 'palmatinerved' in the sense of Pax & Hoffmann. I refrain from proposing a new name until a more thorough investigation can be carried out.

XV. ADDITIONAL RECORDS FOR SEBASTIANIA BORNEËNSIS PAX

(P. & H. 246)

Sebastiania bornëensis Pax was described nearly 50 years ago (Engl., Pflanzenr. IV. **147**, v, 122: 1912) on two collections only (*Beccari* 3127 from Sarawak, *Winkler* 3271 from SE. Borneo), and until the recent description by van Steenis (in Bull. Bot. Gard. Buitenz. ser. 3, **17**, 409: 1948) of two new species, evidently related to it, from Sumatra and the Lingga Islands, these Bornean specimens remained the only evidence for the occurrence of a shrubby *Sebastiania* in the Old World. In recent years, however, further collections, both new and old, of *S. bornëensis* have come to light, and in view of the apparently local occurrence of the species and rarity in Malaysia of the group as a whole, it seems of interest to put these additional specimens on record.

Sarawak. Batang Lupar R., Marop, 1865–8, *Beccari* 3127. Sarawak River, Trusan, near Fort, comm. June 1890, *Haviland* 'b.h.m.c.' and 'b.k.k.a.': 'Shrub'. Upper Rejang River, Gat, forests, 1929, *J. & M. S. Clemens*

21665: '25 ft. tree; infl. yellow, fruit red-purple'. Setapok, Kuching, lowland forest, 30 m., 17 April 1956, *Purseglove* 4867: 'Shrub 10 ft. Leaves grey-green beneath'.

Brunei. Ulu Belalong, Temburong, 255 m., primary forest on yellow sandy clay, tertiary sandstone ridge, 5 Sept. 1957, *Ashton* BRUN 443: '20 ft. understorey tree. Yellow unisexual flowers. Fruit red and white, 3-lobed, pendent. Pale brown smooth bark. Thin soft outer bark, hard pale brown 1/10 in. inner bark. Pale yellow medium hard sapwood. Glaucous underside to leaves'.

The Brunei specimen provides an appreciable northerly extension of the known range. It is curious that the species seems not yet to have been re-collected in the southern part of Borneo.

The fruit of *S. borneënsis* has not hitherto been described. Unfortunately, although both Clemens and Ashton refer to fruits in their field-notes, no fruits are present with the specimens. The only fruit preserved at Kew is a dehisced and damaged one on one of the Haviland sheets: it appears to have been about 1·5 cm. in diameter, with a thin, smooth, brown pericarp, and hard endocarp about 1·5 mm. thick. The one surviving (damaged) seed is about 8–9 mm. long, with a smooth, slightly mottled, brown testa. The fruit is borne on a long, straight, rigid pedicel, almost 10 cm. in length, which led the late Dr. O. Stapf to write on the sheet, not surprisingly, 'cf. *Cleidion*'. The resemblance is quite striking.

Since writing the above I have had the opportunity of examining the duplicate of *Ashton* 443 preserved in the Leiden Herbarium. A complete fruit attached to this is 1·5–1·6 cm. in diameter, 1·1 cm. long; pericarp very smooth, rather light brown, the sutures of the loculi darkened and very slightly keeled; base of style persistent (very short); peduncle 6–6·8 cm. long.

Operculina macrocarpa (L.) Urban (Convolvulaceae) in West Tropical Africa.—During the revision of the *Convolvulaceae* for the second edition of the 'Flora of West Tropical Africa', it was found that one species of the genus *Merremia* Dennst., *M. alata* Rendle, described in the 'Flora of Tropical Africa' (**4**(2), 102: 1905) and also included in the first edition of the 'Flora of West Tropical Africa' by Hutchinson & Dalziel, did not agree with the specific circumscription of this genus in the modern sense accepted by S. J. van Ooststroom in Blumea **3**, 361 (1939), and in Fl. Malesiana, ser. 1, **4**, 454 (1953), and by A. D. J. Meeuse in Bothalia **6**, 708 (1958). It was, indeed a typical representative of the genus *Operculina* Silva Manso, which genus was reduced to *Merremia* by Baker & Rendle in their treatment of *Convolvulaceae* for the 'Flora of Tropical Africa' (*l.c.* 101: 1905). Further studies of this rather unusual and puzzling plant brought to light that *Merremia alata* Rendle is conspecific with the Brazilian *Operculina macrocarpa* (L.) Urban, and *Operculina* is, therefore, an additional genus for the revised 'Flora of West Tropical Africa'. Rendle's name can be added to the full and carefully established synonymy which was given in 1902 by I. Urban. Only the more important synonyms and citations are given here:—

Operculina macrocarpa (*L.*) *Urban*, Symb. Antill. **3**, 343 (1902)

Convolvulus macrocarpus L., Syst. Nat., ed. 10, **2**, 923 (1759); Sp. Pl., ed. 2, 222 (1762)

Operculina convolvulus Silva Manso, Enum. Subst. Brazil. que podem promover a catarze 49 (1836); Meissn. in Mart., Fl. Bras. **7**, 211, t. 74* (1869)

Merremia alata Rendle in Dyer, Fl. Trop. Afr. **4**(2), 102 (1905); Irvine, Pl. Gold Coast 282 (1930); Hutch. & Dalz., Fl. W. Trop. Afr. **2**, 212 (1931); J. M. Dalz., Useful Pl. W. Trop. Afr. 440 (1937); **synom. nov.**

A rather remarkable fact is that the British Museum's specimen of *Merremia alata* Rendle (Togo prope Lome, 1900/1902, *Warnecke* 273), which specimen I designate the lectotype, bears the original identification '*Operculina alata* U.D., n. sp.' on the label (written by the same hand that wrote most of the labels of the Warnecke Collection from Togo; 'U.D.' representing Udo Dammer) from which Rendle apparently has taken the epithet as well as the suggestion that this should be a new species. Rendle could not have studied a fruiting specimen when preparing the description of his new *Merremia* (fruit characters are essential for the distinction between *Merremia* and *Operculina*) and curiously enough, his newly described plant is not listed in the index of this volume of the 'Flora of Tropical Africa'.

Operculina macrocarpa (L.) Urban is a native of Brazil and occurs also in the West Indies (Lesser Antilles): Linnaeus's *Convolvulus macrocarpus* (1759) is based on plate XCI, fig. 1 of Plumier's 'Plantarum americanarum fasciculus quartus', ed. J. Burmann, 1756, and Plumier's original drawing for this plate was made from a plant collected by him in Martinique (according to Desrousseaux in Lamarck, Encycl. **3**, 545: 1791; cf. I. Urban, in Beih. Fedde Rep. **5**, 56: 1920), so that this West Indian island has to be considered as the type locality of *Operculina macrocarpa* (L.) Urban. Furthermore, Grisebach (Syst. Unters. Veg. Karib. 100: 1857) has noted the plant from Guadeloupe (cf. I. Urban, Symb. Antill. **3**, 344: 1902). For West Tropical Africa it is now recorded from the following collections:—

Ghana (Gold Coast). Without locality, *Irvine* 1 (not seen); Takoradi, (fl. & fr. Oct.), *Howes* 979!; Odumassu, (Oct.), *Johnson* 155 (K! paratype of *Merremia alata*); Krobo Plains, (Dec.), *Johnson* (K, paratype of *Merremia alata*); Cape Coast, (fr. Sept.) *Hall* 1600!

French Togoland. Lomé, *Warnecke* 273! (BM!, lectotype, K!, isolectotype of *Merremia alata*); without locality, (fl. & fr. Nov.) *Mildbraed* 7502!

J. M. Dalziel, in his 'Useful Plants of West Tropical Africa', gives only the following notes on *Merremia alata* Rendle (more or less copied from F. R. Irvine's 'Plants of the Gold Coast'):—

'**Gold Coast**: Twi, Akwapim *abia* (Irvine). The large white seeds are used as beads, and the plant has undefined medicinal uses.' [The ripe seeds are absolutely black; Irvine must have seen only unripe ones].

Mr. J. B. Hall, of Mfantsipim School, Cape Coast, Ghana, whom the present writer told about this curious plant, very kindly sent fresh fruits and seeds to the Herbarium as well as for growing in the Gardens, where seeds germinated a few days after their arrival in 1959. He also found out some very interesting uses of *Operculina macrocarpa* in Ghana folklore, which are apparently unpublished and were not even mentioned—the native name

* An excellent illustration of the plant.

excluded—by Dalziel. Mr. Hall wrote in his letter dated 17th September, 1959: 'The Fante name is Ebia, not translatable so far as I know. The string of seeds enclosed in the packet [6·5 cm. long, containing 8 seeds; now in the carpological collection of the Herbarium at Kew] was bought for 3d. in the Cape Coast market, and is used in making a bracelet called 'abam', which is worn by a woman who has given birth to twins. It is believed that if she goes to a fetish priest, he can converse with the spirit in the abam, and it will tell him of the future of the twins. It makes a kind of whispering noise, which the priest translates. I suppose it is a kind of ventriloquist trick, though I have never witnessed it myself.—The calyx of the young fruit frequently contains water, which oozes out when you pluck the fruit. The cap of the unripe fruit is rather more fleshy than the lower part of the pericarp, and projects along the line of junction [the typical character of the genus, from which Silva Manso took the generic name 'Operculina' after this 'operculum', described here by Mr. Hall as 'cap'].—The plant is fairly common round Cape Coast, and from its having such a vernacular name, and these long-established uses, I should say that it must have been naturalized for quite a time.'

The fact that this plant is also fairly common round Bahia, in Brazil (cf. Meissner in Martius, l.c.: 1869), and was also found in Martinique and Guadeloupe, all of which were like Cape Coast, famous harbours for the Slave-trade, makes it most probable that *Operculina macrocarpa* was introduced into West Africa during the time of the Slave-trade, perhaps by slave-traders who used the seeds for exchange as a kind of bead for ornamental purposes. Another possibility is that the seeds were introduced in the early Portuguese time of the colonization of the Gold Coast, by Roman Catholic missionaries coming from Portuguese settlements in Brazil or having had contact with such places, and who realized that they would be useful for making beads. Among the Brazilian natives, *Operculina macrocarpa* is a well-known medical plant—'Batata de Purga', cf. B. A. Gomes in Memor. Math. e Phys. Acad. R. Sci. Lisboa **3**(1), Mem. dos Correspondentes 27, t. 3, 1812; Martius, Reise in Brasilien **1**, 547 (1823) and Syst. Mat. Medic. Bras. 78 (1843); Silva Manso, *l.c.* (1836)—and is sometimes cultivated (cf. Meissn. in Mart., Fl. Bras. **7**, 212: 1869), but a use similar to that recorded in the present note could not be traced in the literature.

H. Heine

Chrysanthemums.*—Written by a successful grower, this book describes the culture of this popular flower and deals with propagation, the preparation of blooms for market and exhibition, classification, pests and diseases, and the raising of new varieties. The author gives some interesting information on the history of the chrysanthemum and describes many of the strange types cultivated in Japan. The book is illustrated by over 50 photographs and a number of line-drawings and should be of great value to all who are interested in the cultivation of chrysanthemums.

H. S. Marshall

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* *Chrysanthemums for garden and exhibition.* By J. Woolman. Pp. 112, nearly 60 photographs and line-drawings. London: W. H. & L. Collingridge Ltd.,1959. Price 12/6.

Notes on African *Araliaceae*: II*

J. R. Tennant

A STRIKING NEW VARIETY OF POLYSCIAS STUHLMANNII

The presence or absence of an articulated pedicel—a generic character which has long been employed for the delimitation of infra tribal groups of genera in the classification of the *Araliaceae*—has its absolute value diminished as evidenced by the occurrence of an inarticulate variety in the present species which belongs to an otherwise articulate genus. As originally described by Harms (Engl., Bot. Jahrb. **26**, 244: 1899) from the Uluguru Mts., *Polyscias stuhlmannii* (type *Stuhlmann* 9122), was thought (from the material then available) to possess invariably an articulated pedicel. Later (Engl., Bot. Jahrb. **53**, 360: 1915) when dealing with the gathering *Deininger* 2883, from Magamba, W. Usambara Mts., which he considered to be conspecific although lacking distinct articulation of the pedicels, Harms transferred the species as a whole to the inarticulate genus *Gastonia* Lam. The resulting new combination, besides introducing to *Gastonia* plants with articulate pedicels, also necessitates the admission of plants with flower-parts in 5's. Lamarck (Encycl. **2**, 610: 1786) allows 10 or 12 stamens and a 10 or 12 carpellary ovary with an equal number of styles. The same lower limits of stamen- and carpel-numbers have been upheld by Bentham & Hooker in 'Genera Plantarum' whilst Harms in 'Die Naturlichen Pflanzenfamilien' retains the same lower limit in the range for carpel number. Deininger's specimen (with *Araliaceae* generally) was destroyed at Berlin during the last War, and it is not known if duplicates were distributed—I have not seen any—but three recent gatherings, *Eggeling* 6668!, *Parry* 189! and *Semsei* 2711! (EA), all from the Magamba Forest Reserve, also lack for the most part articulated pedicels, and yet very occasionally an articulated pedicel occurs in the former two collections and especially in *Eggeling* 6668 where it can be seen in both flowers and fruits. The occasional occurrence of this character in a specimen, whilst the vast majority of the pedicels observed on that specimen are inarticulated, coupled with the very great similarity in other respects of articulated and inarticulated pedicelled variants, justifies, in my opinion, but a single species for the assemblage within *Polyscias*, and *not* a transfer of the species to *Gastonia*, as concluded by Harms. I therefore regard the inarticulated taxon as a variety.

Polyscias stuhlmannii *Harms* var. **inarticulata** *Tennant*, var. nov. a typo pedicellis persaepe vel semper inarticulatibus differt.

Gastonia stuhlmannii (Harms) Harms in Engl., Bot. Jahrb. **53**, 360 (1915), *pro parte*.

Type: Tanganyika, Lushoto District, W. Usambara Mts., Shume-Magamba Forest Reserve, Gologolo, 1780 m., fl. & fr. Aug. 1953, *Eggeling* 6668 (K, holotype, EA, isotype).

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* Continued from Kew Bull. **14**, 224 (1960)

So far, var. *inarticulata* has only been recorded from the one above mentioned locality in the W. Usambara Mts., where also occurs the articulated variant; recent collections of the latter include:—

Lushoto–Malindi Road, near Mazamba Peak, 1900 m., fr., 29 May 1953, *Drummond & Hemsley* 2810; Shume-Mazamba Forest, 2000 m., fl. 14 Ap. 1954, *Willan* 140; Shagai Forest, near Sanga, 2000 m., fl. 17 May 1953, *Drummond & Hemsley* 2606; Shagayu Forest, 2000 m., fl. May 1953, *Procter* 228

THE HABIT OF CUSSONIA CORBISIERI DE WILD.

Cussonia corbisieri De Wild. in Fedde, Rep. 13, 200 (1914); Notes Fl. Katanga 144 (1921) & 60 (1927).

Types: Belgian Congo, Katanga: Welgelegen, *Corbisier in Homblé* 635; and *Corbisier & Florent in Homblé* 649 (BR, syntypes)

The arborescent habit attributed by De Wildeman to this species in his original and later descriptions is at variance with the actual habit. This could easily be explained because the type-specimens are not wholly representative in that they lack the very characteristic rootstock and also lack field-notes. The species is low-growing, more or less herbaceous with the leaves and flower-spikes borne generally near the apex of the short, thick more or less subterranean rootstock or at the apices of its short stout branches; unquestionably the species is not arborescent as the original description demands. In the collections I have studied which lack the rootstock (including both type specimens) a useful indication of a low growing habit (although of an inorganic and implied nature) is afforded by the presence of small particles of substratum (sand) remaining adhered to the bases of petioles and spike-rhachises after the specimens have been collected and mounted in the usual way.

A NEOTYPE FOR CUSSONIA HOLSTII ENGL.

Cussonia holstii *Engl.* in Abh. Preuss. Akad. Wiss. **1894**, 64 (1894).

Since the previous note on this species (Kew Bull. **14**, 223: 1960) in which I delayed proposing a neotype on the grounds of having seen only a single inadequate specimen from the type-locality, two excellent gatherings have recently been received from the East African Herbarium, Nairobi. These specimens collected by Mr. S. R. Semsei (Nos. 2829 and 2817) are both typical of the collections of the variety seen elsewhere in tropical Africa and were gathered probably from very near to the place where Holst collected the original type, the location of which could not be precisely determined. I designate the following specimen as neotype.

Tanganyika. Lushoto District: Usambara Mts., near Mlalo Marketplace, in abandoned African cultivation, fr. 20 Nov. 1958, *Semsei* 2829 (K, neotype): —soft wooded large tree with rough grey bark; fruits green; sometimes used as a shade tree in coffee plantations.

New and noteworthy *Scrophulariaceae* in Africa

F. N. Hepper

The following notes have resulted from a study of the *Scrophulariaceae* for the revision of the 'Flora of West Tropical Africa' and the paper deals with plants in the genera *Alectra*, *Bacopa*, *Craterostigma*, *Sopubia* and *Striga*.

ALECTRA Thunb.

Alectra linearis *Hepper*, sp. nov. (sect. *Alectra*; subsect. *Mucronulatae* Melchior); affinis *A. aurantiacae* Hemsl., sed filamentis glabris (haud barbatis), habitu tenuiore et graciliore differt. Fig. 1 (p. 403).

Herba annua, tenuis, ± erecta, ut videtur semi-parasitica. *Radix* fibrosa, parva. *Caulis* gracilis 17–40 cm. altus, utrinque lineis pilorum ornatus, ramis lateralibus axillaribus praeditus. *Folia* sessilia, linearia, (2–) 3–5 cm. longa, 2–8 mm. lata, apice subacuta, marginibus minute et remote dentato-serratis, costa marginibusque ciliatis exceptis glabra. *Flores* in axillis foliorum solitarii, subsessiles vel breviter usque 5 mm. pedicellati. *Bracteolae* 2 ad basin calycis sitae altera lineari-lanceolata et altera lineari, ciliatae. *Calyx* campanulatus, 12–15 mm. longus, 10-nervis, pilosus; dentes 5, c. 5 mm. longi, apice ciliati subacuti. *Corolla* subflava, c. 17 mm. longa, lobis 5 ut videtur subaequalibus, basi glanduloso-pubescens. *Stamina* 2 + 2, filamentis omnibus glabris, thecis basi in mucronulam aculeiformem productis. *Ovarium* 2-loculare, stylo c. 2 cm. longo sursum recurvato; capsula ovoidea, 9 mm. longa, 5 mm. lata; seminum testa externa 0·9 mm. longa, haud translucida, castanea, reticulata.

Ivory Coast: Cercle du Baoulé-Nord, environs du Nzi, prés Mbayakro, fl. 2 fr. 4 Aug. 1909, *Chevalier* 22286 (P!).

SE. Nigeria: Onitsha Prov., Awka Dist., Mamu R. flood plains, 3 miles from Umuoka, in permanently wet swamp, confined to better drained tops of old yam heaps, fl. 8 May 1942, *A. D. P. Jones in F.H.I.* 6142 (K! holotype; FHI! isotype): rather lax herb c. 30 cm. long, very small root system and probably semi-parasitic; flowers pale yellow.

N. Nigeria: Kabba Prov., Lokoja, fr. 28 Oct. 1908, *Dalziel* 218 (K!).

The specimen collected by Dalziel had remained for many years at Kew in a North East Tropical African cover as '*Alectra* sp.?' and apparently had thus been missed for the first edition of the 'Flora of West Tropical Africa'. Amongst specimens on loan to Kew from the Forest Herbarium, Ibadan, was a collection by A. P. D. Jones which appeared to be of the same undescribed species. According to Ibadan records there should be a duplicate of this number at the British Museum which I have not traced. Amongst specimens of *Alectra* kindly loaned by the Paris Museum was another sheet of *A. linearis* with 3 unnamed specimens on it collected by Chevalier in the Ivory Coast.

This species runs down to *A. rigida* (Hiern) Hemsl. in Melchior's revision of the genus (1941), but it is not closely related to that species and is easily distinguished from it by the very few large flowers, pilose calyx and spreading leaves. *A. linearis* appears to be close to *A. aurantiaca* Hemsl. from which it differs in the stamens all being glabrous and in the habit being more slender and laxer and in lacking the orange-coloured root.

FIG. 1. *Alectra linearis* Hepper. 1, habit, × $\frac{2}{3}$; 2, calyx, × 2; 3, corolla (dried), × 2; 4, corolla (dissected), × 2; 5, stamen, dehisced, × 7; 6, pistil, × 2; 7, seed, × 20; 8, reticulation of testa, × c. 40; 9, embryo extracted from seed, × 20. Drawn from *A. D. P. Jones in F.H.I* 6142.

I have only dried material at my disposal from which it is difficult to reconstruct the form of the corolla, but there appear to be 5 more or less equal lobes and my drawing might have to be modified when fresh (or spirit) material is obtained.

Alectra rigida (*Hiern*) *Hemsl.* subsp. **paludosa** (*A. Chev.*) *Hepper*, stat. et comb. nov.; a subspecie typica differt calycibus glabris, bracteis glabris, solum margine ciliatis.

A. paludosa A. Chev., Expl. Bot. 475 (1920)
[*A. virgata* of Hutch. & Dalz., Fl. W. Trop. Afr. **2**, 223 & Melchior in Notizbl. Bot. Gart. Berl. **15**, 437 (1941), partly (*Chevalier* 18896 and syn.) not of Hemsl.]

Portuguese Guinea: Bissau, Bór, trepadeira dos terrenos humíferos, húmidos, da clareira da floresta hidrófila; fl. & fr. 3 Jan. 1943, *Esp. Santo* 1448 (K!):—flores brancas. Bissau, Pelubé, erva anual dos capinais dos capinais dos solos húmidos alagados na época pluviosa; fl. 24 Dec. 1944, *Esp. Santo* 1613 (K!):—flores amareias.

Guinea Republic. Dalaba-Diaguissa Plateau, Dalaba, prairies marécageuse, 1000–1300 m., 17–18–20 Oct. 1907, *Chevalier* 18896 (P!, holotype; K!).

Sierra Leone: Colony, Waterloo; grassfield on lateritic concretion area; fl. & fr. 1 Dec. 1936, *Deighton* 3282 (K!):— flowers yellow. Near Kent; grassfield; 1936, *Deighton* 3301 (K!):—flowers yellow. N. Prov., Port Loko Dist., Maforki Chiefdom, near Mankara; in thatch-grass on swamp edge; fl. & fr. 22 Oct. 1952, *Jordan* 812 (K!):—flowers pale yellow.

When Chevalier published the name *Alectra paludosa* he gave it a short but adequate description, thus validating it, unlike many others in the same publication. However, I feel Chevalier's plant is insufficiently distinct from *A. rigida* to merit specific rank as it apparently differs only in the glabrous calyx. Due to its discontinuous distribution I have made it a subspecies rather than a variety.

The *ALECTRA SESSILIFLORA* (Vahl) Kuntze complex in Africa

Hitherto this species has been regarded as having a distribution in southern Africa and Madagascar. H. Melchior in his revision of the genus *Alectra* (1941) correctly rejected Bentham's *A. melampyroïdes* in favour of *A. sessiliflora* (Vahl) Kuntze (but unfortunately used, for an American species, the name *A. melampyroïdes* (L. C. Rich.) Kuntze which is a *nomen illegitimum*). Other species of his Subsect. *Mucronulata*, which Melchoir maintained as distinct, would seem to be better placed as varieties of *A. sessiliflora* or reduced to synonymy, and that is the purpose of this note. Whilst tackling this problem from the point of view of those taxa in West Africa, I have had to look at others from all parts of Africa and even from Asia, but my treatment can by no means be regarded as exhaustive and I suspect there are other names that really belong to this aggregate.

A puzzling occurrence in *A. sessiliflora* is the absence of hairs on the filaments in most of the South African specimens, whilst further north similar plants have the longer filaments densely bearded or at least pubescent. A great deal has been made of the presence or absence of hairs on the filaments in the classification of species in this genus. In most of the species this reliance seems to be justified, but I am very doubtful whether that is so in *A. sessiliflora* and in its close relatives. Melchior makes no mention of the fact that most of the South African specimens (at least at Kew) have glabrous

filaments and these plants would key out into quite the wrong group. In dealing with the Welwitsch collection, Hiern indicates that the filaments are glabrous, yet in 'Flora Capensis' he says that they are more or less pubescent.

The following synonymy should be supplemented where applicable with others given by Melchior in his account of the genus; the synonyms given below are the more important ones, basionyms, and those that are concerned with the present changes of status and changes subsequent to that account.

Alectra sessiliflora (*Vahl*) *Kuntze* var. **sessiliflora**; Kuntze Rev. Gen. Pl. **2**, 458 (1891); Melchior in Notizbl. Bot. Gart. Berl. **15**, 437 (1941)

Gerardia sessiliflora Vahl, Symb. Bot. **3**, 79 (1794)
A. melampyroides Benth. in DC., Prodr. **10**, 339 (1846)
A. barbata (Hiern) Melchior in Notizbl. Bot. Gart. Berl. **15**, 125 (1940) & 438 (1941)
A. senegalensis Benth. var. *pallescens* Bonati in Bull. Soc. Bot. Fr. **74**, 96 (1927), *nomen nudum*; Melchior, *l.c.* 439 (1941)

All leaves sessile, usually broadly cuneate at the point of insertion and without a distinct petiole; upper leaves not becoming petiolate; lamina ovate to broadly ovate-lanceolate, usually deeply toothed in lower part, obtuse or acute and long-attenuate at apex, erect; stem more or less densely pubescent with erect white hairs; calyx ciliate on upper margin and only rarely on the nerves; filaments glabrous or the two longer bearded.

HOLOTYPE: Cape of Good Hope, *Bülow* (C!) (see discussion below).

NYASALAND: Chikwawa District, *Brass* 18004 (K!). SOUTHERN RHODESIA: without locality, *Hislop* Z82 (K!). NORTHERN RHODESIA: Barotse Province, Kalabo, *H. J. A. Rea* 184 (K!). ANGOLA: Bié District, Kampuluve, *Baum* (K!). MADAGASCAR: Ampassimentera, *P. de la Bâthie* (P!). SOUTH AFRICA: Cape Province, Cape of Good Hope, *Bülow* (C!); Natal, Nottingham Road, *McClean* 924 (K!); Transvaal, Krugersdorp, *Rodin* 3919 (K!).

Thanks to the kindness of the Curator, the Botanical Museum, Copenhagen, I have had on loan a specimen from the Vahl herbarium labelled *Gerardia sessiliflora* Vahl. Although there is no indication on the sheet of the collector, it is reasonable, I think, to assume that this is the specimen collected by Bülow upon which Vahl based his description of the species, and I have taken this to be so. There are two small specimens upon the sheet: one has flowers and fruits whilst the other is only the lower part of a plant. It is easy to see that they have the facies of the South African plants, but I did not dissect a flower from so valuable a sheet to see the filaments.

A. barbata (Hiern) Melchior was based on *Melasma barbatum* Hiern but the type (*Galpin* 929) was not seen by Melchior. Apart from the rather larger flowers, I can see no reason for maintaining this as distinct from *A. sessiliflora* and I regard it as a synonym of the latter.

Alectra sessiliflora var. **senegalensis** (*Benth.*) *Hepper*, stat. et comb. nov.

A. senegalensis Benth in DC., Prodr. **10**, 339 (1846)
A. cordata Benth., *l.c.* (1846)
A. senegalensis var. *minima* A. Chev., Expl. Bot. 475 (1920), *nomen nudum*

Lower leaves truncate, rounded or cordate at base, sessile or sometimes with a small, slender petiole about 1 mm. long, upper leaves often cuneate

and petiolate; lamina suborbicular, broadly ovate to ovate, subentire to deeply toothed, obtuse to acute at apex, spreading, pubescent; stem usually densely pubescent with erect white hairs; calyx ciliate on nerves and margin; the two longer filaments always bearded.

LECTOTYPE: Senegal, *Leprieur* '9 and 10' (K!)

In the following distribution list I have cited one specimen for each country in which the subspecies occur:

SENEGAL: *Leprieur* 9, 10 (K!). GAMBIA: *Brown-Lester* 27 (K!). FRENCH SUDAN: Kita, *Chevalier* 3297 (K!). PORTUGUESE GUINEA: Bissau, *Esp. Santo* 1820 (K!). GUINEA REPUBLIC: *Heudelot* 787 (K!). SIERRA LEONE: Picket Hill, *T. S. Jones* 228 (K!). N. NIGERIA: Naraguta, *Lely* 502 (K!). W. NIGERIA: Akure Dist., *Latilo & Olorunfemi in F.H.I.* 24448 (K!). BRITISH CAMEROONS: Mt. Cameroon, *Mann* 1985 (K!). FERNANDO PO: Moka, *Boughey* 82 (K!). CONGO REPUBLIC: Kidima, *Callens* 3511 (K!). SUDAN: Imatong Mts., *A. S. Thomas* 1627 (K!). ETHIOPIA: Gafta, *Schimper* 1229 (K!). UGANDA: Kigezi, *Chandler & Hancock* 2648 (K!). KENYA: Teita Dist., *Drummond & Hemsley* 4385 (K!). TANGANYIKA: Usambara Mts., *Drummond & Hemsley* 2704 (K!). NORTHERN RHODESIA: Abercorn Dist., *M. Richards* 241 (K!). MOZAMBIQUE: Quelimane Dist., *Faulkner* Pretoria No. 18A (K!).

The specimens Chevalier called *A. senegalensis* var. *minima* are a form approaching *A. sessiliflora* subsp. *sessiliflora* having the erect sessile leaves that are so typical of that subspecies. The specimens are *Chevalier* 18428 (P!) and another, placed by Chevalier under *A. senegalensis* proper but which appears to be the same form, is *Chevalier* 18435 (P!). Both were kindly loaned by the Paris Museum.

A. cordata Benth. differs from *A. senegalensis* only in the cordate leaf-base and, in view of the variation already shown by *A. senegalensis* leaves, can hardly be maintained as distinct.

Alectra sessiliflora var. **monticola** (*Engl.*) *Melch.* in Notizbl. Bot. Gart. Berl. **15**, 126 (1940) and 438 (1941).

Glossostylis avensis Benth., Scroph. Ind. 49 (1835)
A. indica Benth. in DC., Prodr. **10**, 339 (1846)
Melasma indicum var. *monticolum* Engl. in Engl., Bot. Jahrb. **30**, 402 (1901)
A. communis Hemsl. in Fl. Trop. Afr. **4** (2), 372 (1906)
A. orvensis [sic!] (Benth.) Merrill in Philipp. Journ. Sci., Bot. **12**, 109 (1917)

All leaves distinctly petiolate, cuneate to rounded at base; lamina oblong-lanceolate to lanceolate, rarely ovate, distinctly and often deeply toothed, subacute at apex, shortly and roughly pubescent to nearly glabrous; stem more or less appresssed-pubescent to subglabrous; calyx ciliate on nerves and margin; the two longer filaments always bearded.

SYNTYPES: Tanganyika, *Goetze* 807; *Goetze* 1137 (BM!).

SIERRA LEONE: Njala, *Deighton* 1515 (K!). LIBERIA: Kakatown, *Whyte* (K!). GHANA: Abetifi, *Irvine* 1666 (K!). W. NIGERIA: Ibadan, *A. P. D. Jones in F.H.I.* 13735 (K!). BRITISH CAMEROONS: Buea, *Migeod* 115 (K!). FERNANDO PO: Moka, *Boughey* 86 (K!). PRINCIPE: Esperança, *Exell* 662 (BM!). CAMEROUN REPUBLIC: Mundame, *Schlechter* 12922 (K!). SUDAN: Equatoria Prov., *Wyld* 644 (BM!). CONGO REPUBLIC: Katanga, *Quarré* 2501 (K!). UGANDA: Mawokota, *E. Brown* 191 (K!). KENYA: Kwale, *Drummond & Hemsley* 3970, partly (K!). TANGANYIKA: Magunga, *Faulkner* 1260 (K!). PEMBA: Chake-Chake, *J. H. Vaughan* 525 (K!). ZANZIBAR: Mahonda Plain, *J. H. Vaughan* 2087 (BM!). MADAGASCAR: *Baron* 1570 (K!). MAURITIUS: *R. E. Vaughan*, 58 (K!). INDIA: Salampur, *H. F. Mooney* 4137 (K!). BURMA: Taong Dong, Ava, *Wallich* 3963 (K!). THAILAND: Dai-Angka, *H. B. G. Garrett* 601 (K!). PHILIPPINES: Luzon, *Merrill* 11211 (K!). CHINA: Yunnan, *A. Henry* 11283A (K!). FORMOSA: Bankinsing Mts., *A. Henry* 1628 (K!).

BACOPA Aubl.

Bacopa crenata (*Beauv.*) *Hepper*, comb. nov.

Herpestis crenata Beauv., Fl. Oware et Benin **2**, 83, t. 112 (1819). Holotype: Nigeria, *Palisot de Beauvois* s.n. (G!)

[*Erinus africanus* of Schumach., Beskr. Guin. Pl. 278 (1828), not of L.]

H. calycina Benth. in Hook., Comp. Bot. Mag. **2**, 57 (1836)

Herpestis thonningii Benth. in Hook., Comp. Bot. Mag. **2**, 58 (1836)

H. calycina Benth. var. *thonningii* (Benth.) Benth. in DC., Prodr. **10**, 399 (1846)

Moniera calycina (Benth.) Hiern, Cat. Afr. Pl. Welw. **1**, 760 (1898)

Bacopa calycina (Benth.) Engl. ex De Wild. in Bull. Herb. Boiss., sér. 2, **1**, 832 (1901)

'*Moniera cuneifolia* of Fl. Trop. Afr. **4** (2), 320 (1906), partly, not of Mich.]

'*Bacopa monnieria* of Fl. W. Trop. Afr. **2**, 222 (1931), not of (L.) Wettst.]

Distribution: Senegal, Liberia, Ivory Coast, Ghana, Togoland, N. Nigeria, S. Nigeria, N. British Cameroons, Sudan, the Congo Republics, Angola and Madagascar.

Thanks to the kindness of Prof. C. Baehni, Geneva, I have received the holotype of Beauvoir's species on loan at Kew. It has the prominently veined, broad, fruiting calyx of the plant hitherto known as *Bacopa calycina* Benth. which name is now replaced by a new combination based on Beauvois'.

CRATEROSTIGMA Hochst.

Craterostigma guineënse *Hepper*, sp. nov.; *C. goetzii* Engl. et *C. schweinfurthii* (Oliv.) Engl. affine, sed a priore calyce haud alato, ab altero inflorescentia laxiore, ab utroque floribus minoribus differt. Fig. 2.

[*C. schweinfurthii* of Sousa in Est. Bot. Anais 5: 39 (1950); and of Chev., Expl. Bot. 472 (excl. Dahomey spec.); not of (Oliv.) Engl.]

Herba annua, stricta, radice fibroso, caule parce ramoso erecto (3–) 25–40 cm. alto quadriangulo. *Folia* opposita, obscure trinervia, omnia lanceolata acuta (4–) 7–20 mm. longa, 3–7 mm. lata margine parce et minute serrato et aspero-ciliato, sessilis. *Inflorescentia* subspicata, interdum floribus singulis remotis infra inflorescentiam productis, (0·5–) 1·5–3·5 cm. longa, terminalis et subterminalis. *Flores* parvi, bilabiati, caerulei, 4–5 mm. diam. *Bracta* ovatae ciliatae. *Calyx* 5 mm. longus, 5-nervis, minute pubescens, 5-dentatus, acutus, dentibus aequilongis. *Corollae* tubus 5 mm. longus, labiis extra minute glanduloso-tomentosis, labio inferiore 3-lobo 2–3 mm. longo, pilis fulvis obtecto, labio superiore integro. *Stamina* 2 + 2, anticorum (inferiorum) parte libera arcuata 1 mm. longa basi appendicem brevem capitatam gerente, filamentis posticis (superioribus) c. 0·5 mm. longis; antheris 2-thecis, caeruleis. *Ovarium* glabrum, stylus haud arcuatus, stigmate plano retuso pubescente. *Capsula* oblonga, 5 mm. longa, 2-locularis; semina globosa.

Senegal: Casamance, Sedhiou to Tambanaba, fl. & fr. Feb., *Chevalier* 2849 (P!).

Portuguese Guinea. Bissau, Antula, fl. & fr. 11 Dec. 1942, *Esp. Santo* 1424 (K!, holotype; LISC): erva anual dos capinais dos terrenos húmidos alagados na época das chuvas.

FIG. 2. *Craterostigma guineënse* Hepper. 1, habit, × ⅔; 2, flower, × c. 4; 3, calyx (opened out) × 6; 4, corolla (dissected), × 6; 5, pistil, × 6; 6, stigma, much enlarged; 7, capsule, × 6; 8, seed, × c. 24; 9, leaf-margin, much enlarged. Drawn from *Esp. Santo* 1424.

Guinea Republic: Fouta-Djalon, entre Timbo et Ditinn, fl. & fr. Sept., *Chevalier* 18422 (P!); sur le plateau de Dalaba-Diaguissa, 1000–1300 m. alt., fl. Oct., *Chevalier* 18764 (P!) 18864 (P!); Grandes Chutes, chemin de fer C.N. km. 107, fl. Dec., *Chevalier* 20239 (P!), 20318 (P!).

At first sight this species looks very like *C. schweinfurthii* (Oliv.) Engl. with which it has been confused. It is distinguished from that species in having much smaller flowers several together usually in an interrupted spike, instead of in a capitate inflorescence. The distribution of *C. guineënse* fits into the north-western corner of West Africa and appears to replace *C. schweinfurthii*, which is now limited to Ghana, Dahomey, N. Nigeria, French Cameroons, Sudan, Uganda, Northern Rhodesia and Angola.

SOPUBIA D. Don

Sopubia mannii Skan and *S. dregeana* Benth.

I am concerned in this note with obtaining the correct name for the West African plants hitherto known as *Sopubia mannii* Skan.

S. mannii was described by Skan (1906) from the Cameroons and separated from *S. dregeana* Benth. and *S. ramosa* Hochst., in particular, by the densely crowded leaves and flowers. Earlier J. D. Hooker (1864) had tentatively called Mann's plant (which later became Skan's type of *S. mannii*), '*S. trifida* Buch.-Ham. ex D. Don var. *madagascariensis* Benth. (?)', and then commented:

'Very similar to the Madagascar species, as also to *S. dregeana* of South Africa, *ramosa* of Abyssinia, and *filiformis* of Guinea, which may all belong to the same species. It is, however, of a shorter and more robust habit than any of them—a difference possibly due to locality'.

Of these it is now possible to eliminate as distinct taxa *S. trifida* var. *madagascariensis* and *S. ramosa* on other characters, whilst *S. filiformis* is now regarded as *Micrargeria*. But *S. dregeana* remains as a possible name for the West African plants.

Bentham regarded his *S. dregeana* as synonymous with *S. simplex* (Hochst.) Hochst. (syn. *Rhaphidophyllum simplex* Hochst.), but rejected the latter name as inappropriate, which is not allowed under Article 62 of the Paris Code. *S. dregeana* is invalidated as Bentham failed to use the earliest available epithet. However, Bentham (1846) cited under *S. dregeana* at least three distinct taxa: *Krauss* 400 can be excluded, for it is in fact the type of *S. simplex*; the specimen from Magaliesberg collected by Burke seems to be related to *S. cana* Harv. as it has a woolly calyx outside and short grey pubescence elsewhere, but I have not been able to find a name for it or several other South African specimens which it matches. And of the other two specimens cited, I have not seen Peddie's but there is ample material of Drège's at Kew for which a name is still required.

The only remaining valid name is *S. mannii* Skan which should now be used in a much wider sense geographically.

Lectotype: I designate *Mann* 1281 (K!) from Cameroon Mt. as the lectotype of *Sopubia mannii* Skan.

Besides typical *S. mannii* there is a variety which occurs in Sierra Leone and in other parts of tropical Africa:

Sopubia mannii *Skan* var. **tenuifolia** (*Engl. & Gilg*) *Hepper*, comb. nov.

S. dregeana Benth. var. *tenuifolia* Engl. & Gilg in Baum, Kunene-Samb. Exped. 365 (1903)

S. trifida Buch.-Ham. forma *humilis* Engl. in Baum, Kunene-Samb. Exped. 365 (1903), excl. syn. *S. decumbens* Hiern.

The isotype of var. *tenuifolia* (*Baum* 475, K) has extremely narrow leaves and it was on this character that the variety was made. However, the most characteristic point about the specimen is the length of the pedicels, which are 1·5–2 4 cm. long, and the lax inflorescence. It is as well to mention here that *S. decumbens* Hiern was described from *Welwitsch* 5839 at the British Museum. Whilst preparing the Flora of Tropical Africa Skan realized that this consisted of two separate entities: one plant he called *S. trifida* Buch.-Ham. var. *decumbens* (Hiern) Skan, and several others on the same sheet he determined as *S. dregeana* Benth., or what should now be called *S. mannii* Skan var. *mannii*. Hiern's description applies to some extent to both taxa but it is possible to limit it to the one plant Skan later called var. *decumbens* on account of the phrase: 'leaves linear and simple *or with two lateral linear lobes* . . . ' *S. trifida* Buch.-Ham. is very close to the species here under consideration but it possesses pinnatifid leaves. This typification of *S. decumbens* Hiern is important in view of the fact that Engler (in Baum, Kunene-Samb. Exped. 365) equated it with *S. trifida* forma *humilis* Engl., but his type (*Baum* 233) is simple-leaved and is the long-pedicellate form of *S. dregeana* which is now to be called *S. mannii* var. *tenuifolia*. The pedicels in the Kew isotype of *Baum* 233 are up to 2·4 cm. long.

There are many specimens of *S. mannii*, especially further south in Africa, that have pedicels longer than 1 cm. reaching 1·5 cm. in fruit, and it is very difficult to decide into which variety they should be placed, but I reject these as coming under var. *tenuifolia* on account of the large number of flowers almost in whorls in the inflorescence. In fact, Drège's plant from South Africa almost comes into this category. True var. *tenuifolia* has long pedicels, very lax usually less frequently branched inflorescences with fewer flowers. It is convenient to have a name of infraspecific rank for these extreme plants, at least where they are so distinct in the West African part of their range.

Sierra Leone: Bintumane Peak, 1800 m., fl. & fr. May 1949, *Deighton* 5089 (K!); same locality, 1500–1800 m., *Glanville* 472 (K!).

Uganda: Masaka Dist., Lake Nabugabo, fl. & fr. Oct. 1953, *Drummond & Hemsley* 4656 (K!); Busoga Dist., Igwe, fl. Oct. 1952, *Wood* 528 (K!).

Cabinda: Mata Lucala, *Welwitsch* 5852 (BM!)

Angola: Kassinga, fl. & fr. Oct. 1899, *Baum* 233 (BM!, K!); Habungu R., fl. & fr. Nov., *Baum* 475 (K! isotype)

Northern Rhodesia: Broken Hill, fl. May 1909, *Rogers* 8046 (K!); R. Lunga at Mwinilunga, fl. Dec. 1937, *Milne-Redhead* 3481 (K!); without precise locality 'river valley, NW. Rhodesia', fl. & fr. Oct. 1908, *Allen* 719 (K!)

Southern Rhodesia: Matopo Hills, fl. & fr. July 1909, *Rogers* 5356 (K!); same locality, 1905, *Gibbs* 99 (K!); same locality, fl. Dec., *Borle* 44 (K!); Zimbabwe, fl. & fr. July 1930, *Hutchinson & Gillett* 3382 (K!); Victoria Falls, fl. & fr. July 1930, *Hutchinson & Gillett* 3481 (K!); 1909, *Monro* 948 (BM!); Leshumo Valley, fl. & fr. Jan. *Holub* 782 (K!); Umtali, fl. & fr. Dec., *Cecil* 234! (K!)

Bechuanaland: Ngamiland, Okavango Valley, fl. & fr. June 1898, *Lugard* 272 (K!)

South Africa: (See note above about these plants). Transvaal, 'Gold fields', 1870, *Baines* (K!); Orange Free State, 1862, *Cole* 2871 (K!); Natal, Mariesburg, fl. & fr. Jan., *Rudatis* 1582 (K!).

Prof. Duvigneaud informs me that he has in the press the description of several new species of *Sopubia* from Belgian Congo. He admits that they fall into the aggregate species *S. mannii* as interpreted in the present paper and may perhaps in future be regarded as having infra-specific rank.

STRIGA Lour

The *STRIGA BILABIATA* (Thunb.) Kuntze complex in Africa

In west tropical Africa there are apparently several taxa of *Striga* that are quite readily separable and they have been maintained as species in the 'Flora of Tropical Africa' and in the first edition of the 'Flora of West Tropical Africa'. I have, however, had considerable difficulty in preparing a key for *S. rowlandii* Engl., *S. barteri* Engl. and *S. ledermannii* Pilger for the revised edition of the latter Flora, as each character, such as flower-size, shape of stem and leaf-form, has broken down when applied to closely related taxa of *Striga* outside West Africa. These are, besides the above, *S. bilabiata* (Thunb.) Kuntze, *S. glandulifera* Engl. and *S. welwitschii* Engl. I will first consider some of the characters that have been used to distinguish species in this group.

Height of plants. Using the 'F.T.A.' concept of *S. rowlandii*, *S. glandulifera* and *S. bilabiata*, the specimens at Kew and a few from the British Museum (Nat. Hist.) of these species were measured for height. The result is shown in fig. 3 as several histograms with the number of plants plotted against height in groupings of 5 cm. length. Fig. 3A is the result of 56 measurements of *S. rowlandii* giving a maximum number of records in the 16 to 20 cm. group and a considerable spread. To save space, this histogram was superimposed upon another of *S. glandulifera* composed of 37 measurements. Here the plants are generally smaller and the maximum was in the 11 to 15 cm. group. There were 243 plants of *S. bilabiata* available and fig. 3B is the result. The same pattern was maintained, with a maximum in the 16–20 cm. grouping, when a composite histogram was made from these three together with 11 specimens of *S. ledermannii*, *S. welwitschii* and *S. barteri*, making a total of 345 specimens measured. There were insufficient specimens available of these last named for the formation of histograms and an attempt to make them could be very misleading. The measurements of the 11 plants are: *S. barteri* 13, 13, 15, 20, 21 cm., *S. ledermannii* 24, 36, 37, 46 cm., *S. welwitschii* 12, 16 cm. I do not think that any importance should be attached to the apparently larger size of *S. ledermannii* as most of the plants were from the same gathering. It would appear, therefore, either that we are dealing with only one species or that height has no specific significance in this group.

Branching characters are difficult to use but wide-angle branching certainly seems to be frequent in *S. barteri* and *S. glandulifera*. In the others, branches usually make a small angle with the stem or are absent or occur near ground-level.

Leaf position, i.e. whether the leaves are appressed to the stem or spreading, is worthless except in general terms.

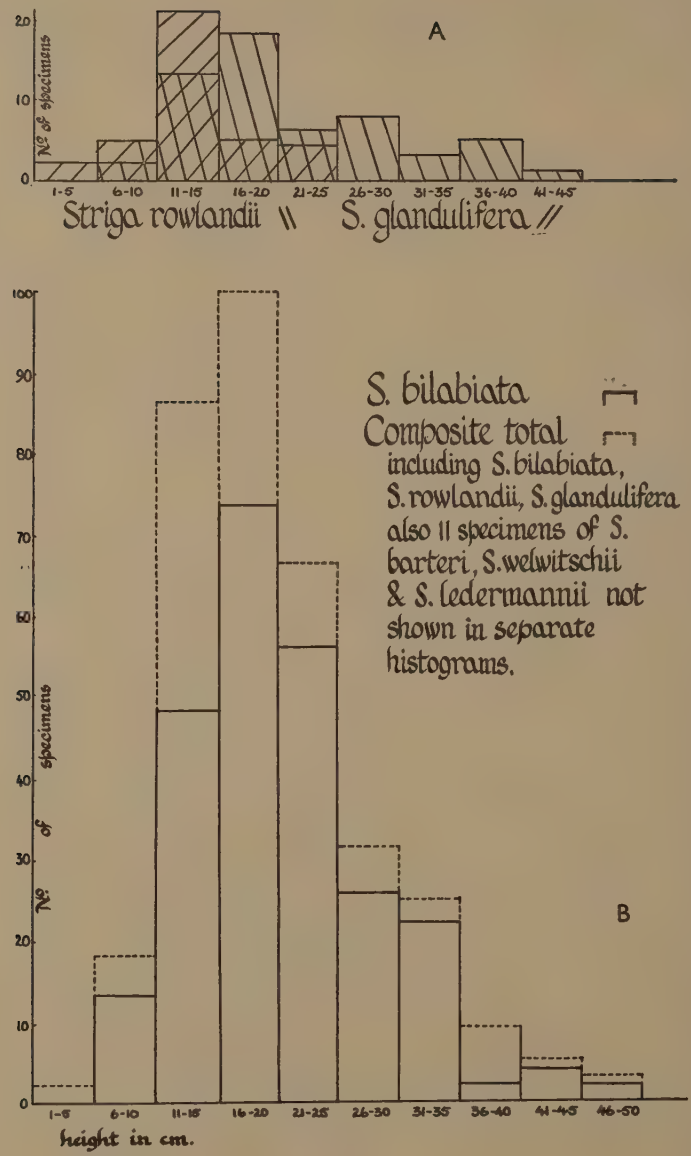

FIG. 3. Histograms showing variation in height in *Striga bilabiata* (Thunb.) Kuntze *sensu lato* (see p.411).

Corolla characteristics are extremely variable. The degree of external pubescence is inconstant, especially in *S. bilabiata*, which can be densely pubescent or almost glabrous. Corolla size seems to bear no relationship to any other morphological characteristics. I noted whilst in Ghana the variability in corolla shape and size of *S. rowlandii* in populations a few miles apart.

It seems best to treat this as an aggregate species using the earliest name available—*S. bilabiata* (Thunb.) Kuntze—with several infra-specific taxa. Having seen a large number of specimens from the whole of Africa I think this is the best solution and I propose to reduce *S. barteri*, *S. rowlandii* and *S. ledermannii* to the rank of subspecies. Owing to the absence of clear-cut distinctions between these subspecies, there are several specimens which cannot be easily assigned, but most of the specimens can be so assgined to a subspecies and these disclose distinct geographical distributions. One new subspecies is also described.

I am grateful to the Director of the Jardin Botanique de l'État, Bruxelles, for kindly lending material of this species for study at Kew.

TABLE 1. Diagnostic characters of the subspecies of *Striga bilabiata* (Thunb.) Kuntze

	subsp. *bilabiata*	subsp. *barteri*	subsp. *rowlandii*	subsp. *ledermannii*	subsp. *jaegeri*
stems	usually obtusely square	terete or obtusely square above	sharply square	sharply square	longitudinally ridged
leaves	often appressed to stem	spreading	spreading	erect, similar to bracts	spreading
bracts	linear to elliptic	linear	lanceolate	elliptic	oblong-lanceolate, acuminate
colour on drying	usually dark	usually green	usually green	usually brown	green
calyx teeth	subulate	often deltoid	subulate	subulate	deltoid
inflorescence	close	rather lax	close	long-strobiliform	strobiliform, elongating later

Striga bilabiata (*Thunb.*) *Kuntze* subsp. **bilabiata**; Kuntze, Rev. Gen. Pl. **3**(2), 404 (1898)

Buchnera bilabiata Thunb., Prodr. 100 (1800)
Striga thunbergii Benth. in Hook., Comp. Bot. Mag. **1**, 363 (1836); Fl. Trop. Afr. (2), 404 (1906)
S. thunbergii var. *grandiflora* Benth. in DC., Prodr. **10**, 502 (1846)
S. welwitschii Engl. in Engl., Bot. Jahrb. **23**, 514, t. 12, fig. F–G (1897)
S. thunbergii var. *grandiflora* Engl. in Baum, Kunene-Samb. Exped. 369 (1903), pro var. nov.

Congo Republic. Lubembe Valley, *Kassner* 2397 (K!); Biano Plateau, *Russell* 41 (K!); *Homblé* 837 (BR!); Lac Leopold II, *Flamigni* 6469 (BR!); Tschaba, *De Giorgi* 256 (BR!); Dembo, *Butaye* 1475, 1498 (BR!); Luano, *Lescrauwaet* 65 (BR!); Lumene, *Vanderyst* 5539 (BR!); Kisantu-Kwango, *Vanderyst* 16596, 17579 (BR!); Lemba, *Jespersen* (BR!); Makala, *Achten* 503A (BR!); Haut Lomami, Kamina, *Mullenders* 1429 (BR!).

Angola: Lopollo, *Welwitsch* 5820 (K!); 5821 (K!) (syntypes of *S. welwitschii* Engl.) 5822 (K!); Longamindung, *Baum* 552 (K!, BR!) (type of *S. thunbergii* var. *grandiflora* Engl.); Kavanga (Cuangar), *Baum* 414 (BR!, K!).

Northern Rhodesia: Mufulira, *Cruse* 121 (K!), 372 (K!); Mumbwa, *Macauley* 867 (K!), 927 (K!); Mwinilunga, *Milne-Redhead* 3577 (K!); Broken Hill, *Rogers* 8131 (K!); Abercorn, *Richards* 365 (K!), 676 (K!), 1169 (K!); *Bullock* 2212 (K!).

Southern Rhodesia: Without locality, *Walters* 2185 (K!); *Hislop* 106 (K!); Marandellas & Sabi Dist., *Myers* 303 (K!); Gwelo, *Gardner* 54 (K!); Lomagundi, *Eyles* 2707 (K!); Macheke, *Eyles* 2015 (K!); Shangani, *Eyles* 951 (K!); Umtali, *Cecil* 159 (K!); Matabeleland, *Elliott* (K!).

Nyasaland: Lilongwe, *G. Jackson* 649 (K!).

Mozambique: Namaacha, *Gomes e Sousa* 445 (K!).

Bechuanaland: Lobatsi, *Tapscott* (K!); Okavango valley, *Lugard* 270 (K!).

Basutoland: Leribe, *Dieterlen* 527 (K!); without locality, *Cooper* 2832 (K!).

Swaziland: Hlatikulu, *Stewart* (K!).

Natal: Newcastle, *Wilms* 2211 (K!); Attercliff, *Sanderson* 428 (K!); Charlestown, *Kuntze* (K!); without locality, *Gerrard* 43 (K!); Inanda, *Wood* 113 (K!); Table Mt., *Krauss* 213 (K!); Tugela valley, *Bayer & McClean* 209 (K!); Underberg, *McClean* 595 (K!); Umgoya *Wylie in Hb. Wood* 5739 (K!), *Rudatis* 543 (K!); Mbunzini, *Mogg* 5935 (K!); Lancaster Hill, *Galpin* 9768!

Cape Province: Kosi Fountain to Knegts Fountain, *Burchell* 2604 (K!); Elandsvlakte, *Esterhuysen* 970 (K!); Theopolis to Port Alfred, *Burchell* 396A (K!); Pondoland, *Sutherland* (K!); Clydesdale, *Tyson* 894 (K!), 2560 (K!); Highlands Station, *Kuntze* (K!), Grahamstown, *MacOwan* 11 (K!); Witte Berge, *Drège* 2297d (K!); Addo *Drège* 2297a (K!); Uitenhage, *Ecklon* (K!); Kat River Poort, *Drège* 2297b (K!) (type of *S. thunbergii* var. *grandiflora* Benth.): Cradock, *Cooper* 2830 (K!) Graaf Reinett, *Bolus* 1848 (K!); Kl. Olifant Rivier, *Schlechter* 3814 (BR!, K!); Queenstown, *Galpin* 1756 (K!); Dohne, *Acocks* 9367 (K!).

Transvaal: Dullstroom, *Galpin* 13131 (K!); Belfast, *Worsdell* (K!); Heidelberg, *Prosser* 1643 (K!); Burtholm, *Burtt-Davy* 18199 (K!); Soutpansberg, *Smuts & Gillett* 4127 (K!); *Mogg* 9476 (K!); Standerton, *Burtt-Davy* 932 (K!); Magaliesberg, *Nation* 313 (K!), *Hutchinson* 2586 (K!); Irene, *Hutchinson* 2381 (K!); Waterberg, *Hutchinson* 2289 (K!); Waterval Boven, *Rogers* 18297!

Orange Free State: without locality, *Cooper* 2829 (K!); Wolwe Kop, *Burke* (K!).

Striga bilabiata subsp. **ledermannii** (*Pilger*) *Hepper*, stat. et comb. nov.

Striga ledermannii Pilger in Engl., Bot. Jahrb. **45**, 215 (1910)

Lectotype: I designate *Ledermann* 4529 (BM!) as lectotype of subsp. *ledermannii*.

(?) British Cameroons: Bogalo, near R. Benue, *Talbot* 313 (BM, K!)

Cameroun Republic: Garua, *Ledermann* 4529 (BM!); 3333, 3495; Jaiya Mt., 900 m., *Mildbraed* 9706 (K!); Buar to Buala, 1100 m., *Mildbraed* 9531 (K!).

Of these, *Mildbraed* 9531, is slender and very like some specimens placed in subsp. *bilabiata* e.g. *Kassner* 2397 from Katanga.

Striga bilabiata subsp. **barteri** (*Engl.*) *Hepper*, stat. et comb. nov.

Striga barteri Engl. in Engl., Bot. Jahrb. **23**, 514, t. 12, fig. E (1897)
S. glandulifera Engl., *l.c.* fig. H–J (1897)

Comparison of the isotype of *S. glandulifera* with that of *S. barteri* has led me to the conclusion that these cannot be maintained as distinct taxa. Although the two names were published at the same time by Engler I have used the epithet *barteri* for the subspecies, as did Andrews in Fl. Pl. Sudan **3**, 143 (1956) for the species.

Senegal: Niokolo-Koba, *Berhaut* 1510 (P!) [the specimen is so poor that I cannot identify it with any degree of certainty].

Portuguese Guinea: Contabane to Guilege, Boé, *Esp. Santo* 3199 (K!).

Guinea Republic: Mali, *Roberty* 16608 (K!).

N. Nigeria: Nupe, *Barter* 1170 (K!), (isotype of *S. barteri* Engl.); Ilorin, Alagbe F.R., *Ejiofor in F.H.I.* 19822 (K!).

Ubangi-Shari: Miangoulou, *Chevalier* 7458 (K!).

Sudan: Niamniam, Mbala Ngia Mts., *Schweinfurth* 2931 (K!), (isotype of *S. glandulifera* Engl.).

Uganda: Mubende Dist., *Lankester* (K!); Ruwenzori, Buddu Marsh, *Scott Elliot* 7481 (BM, K!); 'boggy grassy land', without locality, *Maitland* 108 (K!); Toro, *Snowden* 27, *Eggling* 4033, *Hazel in Maitland* 706 (all K!); R. Kafu, *Bagshawe* 819 (BM!); Unyoro to Ankole, *Tufnell* (BM!).

Tanganyika: Bukoba Dist., Nddma, *Haarer* 2227 (K!).

The Portuguese Guinea and Guinea Republic specimens cited above are more glabrous than usual in this subspecies. They are also very congested from a half-woody base and the calyx-teeth are rather longer. I include them here with an element of doubt.

Striga bilabiata subsp. **rowlandii** (*Engl.*) *Hepper*, stat. et comb. nov.

Striga rowlandii Engl. in Engl., Bot. Jahrb. **23**, 513, t. 12, fig. A–D.
S. sp. indet in Berhaut, Fl. Sen. 84 & 263.

Senegal: Niokolo-Koba, *Berhaut* 1630 (K!); *Perrottet* 649 (BM!).

Gambia: without locality, *Hayes* 539 (K!).

Mali Sudan: Dougoura, *Chevalier* 336 (K!).

Portuguese Guinea: Bissau, Pussubé, *Esp. Santo* 1504 (K!).

Guinea Republic: without locality, *Pobéguin* 364 (K!).

Sierra Leone: Mange, *Glanville* 241 (K!); Rhombe, *Adames* 146 (K!), 224 (K!); Falaba, *Scott Elliot* 5207 (K!, BM!).

Ghana: Sesiamang, *A. S. Thomas* D.138 (K!); Afram Plains, *W. H. Johnson* 709 (K!); Yendi *Hepper & Morton* A.3110 (K!); Okroso to Otiso ferry, *Hepper & Morton* A3039 (K!).

N. Nigeria: Kaduna, *Hill* 51 (K!); Jos Plateau, *Lely* P.83 (K!); Vom, *Dent Young* 185 (K!); Zaria, Mando F.R., *Keay in F.H.I.* 25833 (K!); Zaria, *Dalziel* 407 (K!), *Milne-Redhead* 5043 (K!); Nupe, *Barter* 1169!; Liruwen-Kano Hill, *Carpenter* (K!); Kabba Prov., Odeke, *Jones in F.H.I.* 2867 (FHI!).

S. Nigeria: Lagos *Rowland* (K!) (type of *S. rowlandii* Engl.); Oyo, Upper Ogun F.R., *Keay in F.H.I.* 23443 (K!).

Striga bilabiata subsp. **jaegeri** *Hepper*, subsp. nov.: a subspecies typica differt bracteis acuminatis latioribus.

S. welwitschii Engl. var. *longifolia* Berhaut, Fl. Sen. 84 (1954), French description only.

Herba perennis (?). *Caulis* vix quadrangularis, in sicco sulcatus, c. 20 cm. altus, ± simplex. *Folia* linearia patentia, 4–6 cm. longa, c. 2 mm. lata. *Inflorescentia* strobiliformis; bracteae obovatae, acuminatae, 7–9 mm. longae, 3–4 mm. latae, ciliatae. *Corolla* c. 1·5 cm. longa, extus pubescens.

Senegal: Ouassodou, *Berhaut* 1681 (BR!).

Mali Sudan: Kita Massif, *Jaeger* K.2 (K, holotype!, STR!).

I am indebted to Prof. P. Jaeger for the loan of his specimens and the presentation of two to Kew. He writes 'l'echantillon récolté le 8, VII, 1944, provient du plateau sommital cuirassé (bowal 600 m.) où il pousse à l'abri d'une touffe arborée peu dense à *Crossopteryx febrifuga*, *Terminalia macroptera*, *Combretum* sp.'

This new subspecies is easily distinguished by the broad bracts, which give the young inflorescences a strobiliform appearance. The specimens from Senegal (*Berhaut* 1681) were at a more advanced stage and are taller than *Jaeger* K.2.

Striga linearifolia (*Schumach. & Thonn.*) *Hepper*, comb. nov.

Buchnera linearifolia Schumach. & Thonn., Beskr. Guin. Pl. 279 (1827)
Striga canescens Engl., Pfl. Ost.-Afr. **C**, 361 (1895)
S. strictissima Skan in Fl. Trop. Afr. **4**(2), 407 (1906)

By kind permission of the Curator, Botanisk Museum, Copenhagen, I have had on loan Thonning's specimens of *Buchnera linearifolia*. There is no doubt that this is what has hitherto been called *Striga strictissima* Skan in West Africa and which is, I am sure, synonymous with *S. canescens* Engl. of East Africa. It may be of interest to note that on the front of one sheet and on the back of the other (each sheet has one specimen mounted upon it) the name '*Buchnera linearis*' has been written. This specimen is not the plant of the same name from Australia, described by Robert Brown (Prod. Fl. Nov. Holl. 437) in 1810.

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The Banks letters.*—Probably one of the greatest figures of the eighteenth century was the Right Honourable Sir Joseph Banks. A president of the Royal Society for 42 years, a Trustee of the British Museum, a member of most of the learned societies of Europe and America, a patron of the arts and sciences, this distinguished man devoted his time and wealth to the interests of science.

On leaving Oxford University in 1763 he journeyed to the coasts of Newfoundland and Labrador to further his researches in natural history. In 1768 he went with Captain Cook on his first voyage round the world, making valuable scientific observations which were afterwards published in the account of the expedition. His companion was Dr. Solander of the British Museum, a Swede by birth and a pupil of Linnaeus. Banks was also intimately associated with the Royal Gardens, Kew. The year 1772 witnessed the retirement of Lord Bute as botanical adviser at Kew and the appointment of Banks to succeed him in that post. Banks remained in effect scientific director without official status until 1819 and the work at Kew was near to his heart. The decision to send plant collectors out from Kew was

* *The Banks Letters*. A Calendar of the manuscript correspondence of Sir Joseph Banks preserved in the British Museum (Natural History) and other collections in Great Britain. Edited by Warren R. Dawson. Pp. xlii + 965. London: The Trustees of the British Museum, 1958. Price 12 guineas.

made soon after he took over its directorship. The first of these collectors was Francis Masson who went to the Cape of Good Hope. Banks was a man of wide interests and a prolific writer of letters. He corresponded not only with the collectors sent out from Kew but 'with all sorts and conditions of men' and it seems probable that no other writer of his day covered so wide a field in his correspondence.

The Banks MSS. were sold in 1886, but much of the correspondence was copied by Dawson Turner and is preserved in the botanical library of the British Museum (Natural History). The remainder was dispersed to various institutions and private collections and is widely scattered not only throughout Great Britain but in countries abroad as well.

The present work was begun before the outbreak of the last war by the editor, Warren R. Dawson, and the late John Ardagh who was formerly in charge of the library in the Department of Botany of the British Museum (Natural History). In the course of the work many national and public institutions were visited and the present calendar comprises epitomes of all the Banks correspondence in Great Britain so far as is known. Most of the letters recorded in this volume are contained in the libraries of the British Museum at Bloomsbury, the British Museum (Natural History) and the Royal Botanic Gardens, Kew, but it also includes related material in various national, public, academic and institutional libraries as well as in private ownership. It provides a guide to all the Banks material available for consultation and authentic copies are dealt with as being of equal value to the originals.

The calendar contains entries of over 7,000 letters which are arranged alphabetically under the names of the persons by or to whom the letters were written. Only letters have been recorded and no reports, memoranda or dissertations have been included. The letters are then arranged chronologically followed by mention of the principal subjects dealt with and a reference to the collection in which the letter may be found. We are told, however, in the Editor's introduction that where letters include a multiplicity of matters it was found impossible to mention them all without making the entries disproportionately long. It is true that many of the Banks letters have been published but in the preparation for publication the editors have nearly always 'touched up' the spelling and punctuation, and in this way have destroyed the mannerisms of the writer.

The preface is written by Sir Gavin de Beer, the recent Director of the British Museum (Natural History), followed by the Editor's introduction. After the introduction there is a note on the concordance between the French Republican Calendar and the Gregorian Calendar; the references and abbreviations are then fully explained. Then follows the main calendar after which there is an appendix of the anonymous, pseudonymous and unidentified letters. A full index is also provided. Under the competent editorship of Mr. Warren Dawson who has devoted so many years to its compilation, we have here a most valuable work which will be found useful as a source of information for students and all those interested in the correspondence of so remarkable a man.

The book is well produced and printed and maintains the high standard of works published by order of the Trustees of the British Museum.

H. S. Marshall

Fungi venezuelani: III*

R. W. G. Dennis

The first extensive collections of fungi made in Venezuela appear to have been those of Fendler, a little more than a hundred years ago. A set of Fendler's fungi was sent by M. A. Curtis to M. J. Berkeley and is now incorporated in the Kew Herbarium. Unfortunately this important material was not adequately published at the time and has since been largely overlooked. It therefore seems desirable to discuss it here in some detail. Fendler's numbers are not included among the manuscript notes from Curtis preserved at Kew, but a little information about their origin can be gleaned from Curtis' correspondence with Berkeley, now at the Natural History Museum, South Kensington. Mrs. Balfour Browne has kindly supplied me with the following extracts from these letters which are of interest in this connection:

(1) Undated but approx. January 1856.

'. . . . Fendler will let me have his Venezuelan fungi en masse if I will make him a remittance immediately on their receipt. This I am unable to do, as these hard war times have pinched me sorely, and this year have left me minus. I am however writing to persons and Societies to see if they will back me in the venture. Can you do anything in England and on the Continent in this behalf. I should like to hear from you about it as soon as may be feasible. As yet Fendler has not over 300 species, I suppose, but he will continue collecting. Of course, I can form no estimate of his future success, but as he collects the higher Orders of Plants chiefly, I do not suppose he will accumulate a very large pile of Fungi. Another thing, I will have no hand in this matter except under your lead. So if you should be indisposed to undertake the redaction of Fendler's collection, there is an end of the matter.

. . . . March 31st, 1856. The above was written 6 or 8 weeks ago. . . . Fendler has returned, and I have offered to buy his Fungi, which will probably reach me in a few days hence. He says that one full Set will take about half the collection, and I judge that the remaining moiety will not permit much division. I propose, if you permit, to send you the full Set for examination and for your sole possession, except in the case of species which you already have in your Herbarium. Shall I send them this Spring or next Autumn? Fendler wishes to return immediately to Caraccas, and offers to collect Sets of Fungi hereafter which I have encouraged him to do. I have some subscribers in this country. Can any be got in Europe? . . . .'

(2) Society Hill, South Carolina, May 21st, 1856.

'. . . . I forgot if I have mentioned the *Receipt* of Fendler's Venezuelan Fungi. I have not yet had time to look through them, but am now daily poisoning a portion, hoping to finish in a few days more. It is a very fair collection, and comprises some very curious things. Most are new to me.

* Continued from Kew Bull. **14**, 60 (1960)

I remember Pol. Rhipidium and Ag. aspratus. Fendler has returned to Venezuela and will now collect *sets* of Fungi, on receipt of which I have engaged to pay $100 (if worth so much) and he to wait for the remainder upon the sale of the specimens. I have more than the above sum guaranteed for the payment by individuals and Societies in this country. It was by no means my purpose to ask you to aid in the *distribution* of Fendler's Fungi: But merely, whether you could find any *subscribers*; supposing that you could mention the enterprize to your correspondents and leave them to subscribe or not, as they please. Of those now in hand, I expect to dispose of all here, except the set which I shall send to you. I will send it next Autumn probably. I shall hardly be able to assort them before that time, being exceedingly busy this year. They are chiefly Hymenomycetes. . . . .'

(3) Wilmington, North Carolina. Jan. 5th. 1857.

'. . . . In examining the specimens, I believe I would like to have you attack the Venezuelan first, as I have a few sets to distribute as soon as they are named. I doubt if there are many novelties among them—but if there are any new species needing description, you can take your time for publication. I am in no hurry for that. I send you a full series of the Venezuelans for your own Herbarium. I think there are 30–40 Nos. of which I have retained no duplicates, but I can not now refer to my list. I think the single specimens are chiefly Agaricineae, and some of them meager and worthless. These Fendlerian specimens were purchased by me and are only for private distribution. Fendler is, I suppose, collecting again for me in Venezuela, and I hope will gather a larger and finer series. I have about $125 subscribed for the new collection. I promised him $100, on receipt of the specimens, he to wait on the sales for the remainder, if worth more . . . . '

(4) Hillsborough, North Carolina. June 17th. 1857.

'. . . . Thanks for your trouble over the Venezuelans. There appears to have been n. spp. enough to reward the labor, far more than I had anticipated. Fendler reports abundance of Fungi in his present explorations . . . .'

It appears, therefore, that the first 300 or so collections were made about 1855 and from the numbers on the material at Kew it is doubtful if Berkeley received many later gatherings from Fendler, in spite of the optimistic note of Curtis' last letter quoted above. No localities are indicated, either on the labels or in the letters but it may probably be assumed they were mostly collected in the Sierra de la Costa between Caracas and Colonia Tovar or in the valley of Caracas and surrounding hills, i.e. in the modern Distrito Federal and states of Aragua and perhaps Miranda. Neither of the two species mentioned in Curtis' second letter are represented by collections from Fendler at Kew, unless '86. Pol. rhipidium. Valenzuela' is a mistake by Berkeley for 'Venezuela'. These common species may have been returned to Curtis. Berkeley published (in Trans. Linn. Soc. London **22**, 129–130 : 1857) an account of three new species based on Fendler's material, apparently to give publicity to the collections. These novelties were: *Hydnum brunneoleucum* B. & C., *Craterellus papyraceus* B. & C. and *Skepperia convoluta* B. & C. A fourth species, *Clavaria paupercula* B. & C., was briefly published in 'Fungi cubenses', 1869, and in the same work the following Cuban *Fungi* were said to occur also in Venezuela:

Agaricus rheicolor Berk. No. 26
Ag. stipitarius Bull. sine numero
Ag. semitectus B. & C. No. 56
Ag. sapineus Fr. No. 1
Polyporus rufoflavus B. & C. No. 77
P. australis Fr. No. 75
P. fumosus Fr. ('Valenzuela') No. 88
P. senex Nees & Mont ('Valenzuela') No. 70
P. radiatus Fr. Nos. 72, 76, 80
P. iodinus Mont. missing
P. Fendzleri B. & C. No. 81
Laschia tremellosa Fr. Nos. 57, 207
Hydnum flavum B. No. 129
Stereum sulphuratum B. & Rav. No. 158
S. hirsutum Fr. Nos. 167, 172
Hymenochaete cacao B. No. 179
H. aspera B. & C. sine numero
H. fuliginosa Lev. No. 178
Corticium ochroleucum Fr. No. 163
Hypochnus albo-cinctus Mont. Nos. 150, 156, 200
H. rubro-cinctus Ehb. No. 219
Typhula tenuissima Curt. 216
Geaster saccatus Fr. No. 237
Lycoperdon pyriforme Schaeff. No. 239
Cyathus poeppigii Tul. No. 240
Aethalium septicum Fr.
Didymium cinereum Fr.
Stemonitis fusca Roth. Nos. 224, 225
Arcyria cinerea Fr. No. 229
Trichia rubiformis P. not traced
T. pyriformis Hoffm. No. 231
Bactridium fulvellum B. No. 287
Ceratium hydnoides A. & S. missing
Peziza raphidofera B. & C. No. 245
Xylaria polymorpha Grev. No. 253
X. obovata B. No. 256
X. clavulata B. & C., missing
X. filiformis Fr. No. 252
Hypoxylon ustulatum Bull. No. 263
H. marginatum Schwein. No. 262
Diatrype antracodes B. & C. No. 266
Sthaeria sepulta B. & C. No. 270

Most of these collections can be traced in the Berkeley herbarium and the numbers assigned to them, not cited in 'Fungi cubenses', are indicated in the above list. It will be seen that they all fall within the first 300 species mentioned in Curtis' first letter. The numbers evidently are not field collection numbers but are arranged according to the mycological system of the day and the two species said to be from 'Valenzuela' fall into their appropriate place in the series of numbers, as one would expect if this is a casual error for Venezuela. All these records were certainly based on Fendler's collections, but they have been generally overlooked and were ignored by the contributors to Chardon & Toro's 'Mycological explorations of Venezuela'. *Hypochnus rubrocinctus* is now regarded as a synonym of the lichenised fungus *Chiodecton sanguineum* (Sw.) Wainio and *H. albocinctus* is probably also a *Chiodecton*. If these are excluded it appears that Berkeley accounted for 46 of Fendler's nonlichenised fungi in his own publications but a considerable number remained unpublished when his herbarium was presented to Kew in 1879. There it fell into the hands of M. C. Cooke, who printed a number of these manuscript names in successives volumes of 'Grevillea', usually with the briefest and most inadequate diagnoses, viz.:

Hypoxylon Fendleri Berk in Grevillea **11**, 132 (1883)
Hypocrea Fendleri B. & C., *l.c.* **12**, 80 (1884)
Polyporus venezuelae B. & C., *l.c.* **15**, 20 (1886)
P. caryophyllaceus B. & C., *l.c.* **15**, 22 (1886)
Poria geogena B. & C., *l.c.* **15**, 25 (1886)
P. flavipora B. & C., *l.c.* **15**, 25 (1886)
P. porotheloides B. & C., *l.c.* **15**, 27 (1886)
Byssosphaeria (*Trichosphaeria*) *pachnostoma* B. & C., *l.c.* **15**, 80 (1887)
Psilosphaeria (*Walrothiella*) *Fendleri* B. & C., *l.c.* **15**, 82 (1887)
Marasmius cinctus Berk., *l.c.* **16**, 121 (1888)
Phialea furfuripes Phil., *l.c.* **19**, 73 (1891)
Bulgaria microspora Berk., *l.c.* **19**, 74 (1891)
Laschia decurrens Cke., *l.c.* **19**, 105 (1891)
L. viridula Cke., *l.c.* **19**, 105 (1891)
L. flabellula Cke., *l.c.*, **19**, 105 (1891)
Merulius sordidus B. & C., *l.c.* **19**, 108 (1891)
Irpex crispatus Berk., *l.c.* **19**, 109 (1891)
Hydnum peroxydatum B. & C., *l.c.* **20**, 1 (1891)
H. artocreas B. & C., *l.c.* **20**, 1 (1891)
H. cohaerens B. & C., *l.c.* **20**, 1 (1891)
Phlebia spilomea B. & C., *l.c.* **20**, 3 (1891)

P. deglubens B. & C., *l.c.* **20**, 3 (1891)
Knoffia tinctor Berk., *l.c.* **23**, 3 (1891)
K. subtilis Berk., *l.c.* **20**, 4 (1891)
Sarcomyces vinosa Massee, *l.c.* **20**, 14 (1891)

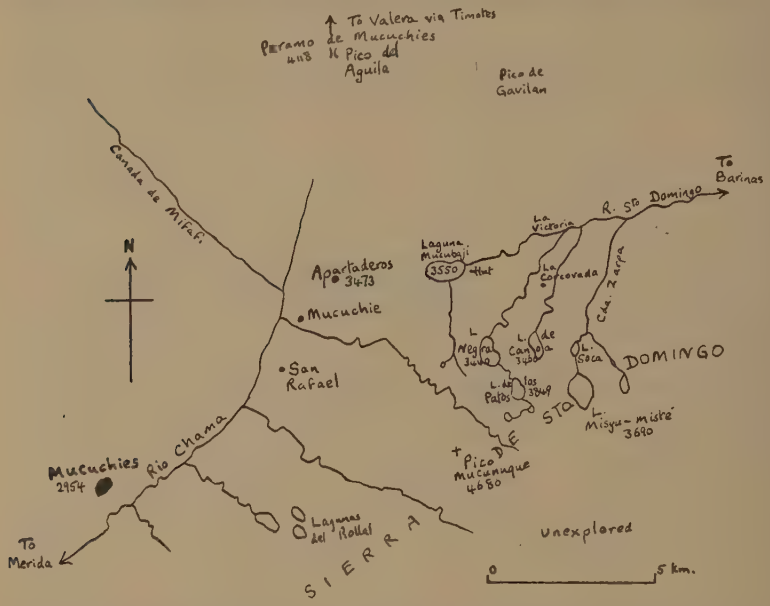
Helotium venezuelianum Phil. was not based on one of Fendler's fungi and there seems no evidence that it actually came from Venezuela.

Meanwhile a few plant parasitic fungi had been sent from Venezuela to Cooke by Dr. Ernst and were described in 'Grevillea' 1880–1882. In 1887 important collections were made in the Orinoco basin by A. Gaillard and described in the following year in collaboration with the famous French mycologist Patouillard. A few fungi from the neighbourhood of Caracas, sent by Gollmer to Berlin, were described by Hennings in Hedwigia 1897.

MAP. 1. Distrito Federal, with parts of the states of Aragua and Miranda, showing localities cited in the text and those visited by Sydow in 1927. Altitudes are given in metres

Eighteen fungi obtained by Warming and others, mostly from Las Trincheras, were published by Ferdinandsen and Winge in Botanisk Tidsskrift 1910. Numerous collections by M. Grisol, mostly from the states of Apure and Guarico in 1923–1925, were listed in papers by Patouillard and Heim, 1926 and 1928. The famous German mycologist, H. Sydow paid a brief visit to Venezuela in 1927 and made extensive collections, chiefly of microfungi, in Distrito Federal and the states of Aragua and Carabobo (Puerto Cabello). Shortly afterwards two Puerto Rican plant pathologists, C. E. Chardon and R. A. Toro, paid a series of visits to Venezuela, in the course of which they made extensive collections, subsequently described by the appropriate specialists in the U.S.A. Their publication, 'Mycological explorations of Venezuela', gives a convenient summary of these later collections. Finally, in 1949, I paid a brief visit to Caracas and Rancho Grande in the state of Aragua, collecting mostly *Agaricales* and *Discomycetes*. In 1958 grants of funds by the Percy Sladen Trust and the Shell Company of Venezuela, with leave of absence kindly given by the Ministry of Agriculture, Fisheries and Food, enabled me to spend the months of June, July

and August collecting fungi in Distrito Federal and the states of Miranda and Mérida. A project to return to Rancho Grande and make a detailed study of the *Agaricales* of this interesting forest park had to be abandoned as the necessary permission from the Forestry Department could not be obtained until a few days before I was booked to return home. Thanks are due not only to the bodies mentioned above but also to Dr. T. Lasser, Government Botanist of Venezuela, for his enthusiastic support and generous



MAP. 2. The lake district of the Sierra de Santo Domingo, based on a map by J. V. Carrillo in Revista del Club Andino Venezolano 1, parts 2/3, 1952

hospitality in Caracas, to Dr. L. Aristeguieta and Dr. Foldats of the Botanic Garden, Caracas, for their interest and help with transport, to Dr. R. Viloria Diaz for generously providing all possible facilities for my work in Mérida and at the field stations of the Faculdad de Ciencias Forestales at Mucubaji and La Mucuy and especially to Senor J. J. Buza who gave up his time to come with me to the paramos of the Sierra de Santo Domingo and act as guide and interpreter. Without his intimate knowledge of the mountains and patient understanding of the mountain people I should have been able to accomplish little in the time available for work in this difficult country. Thanks are also due to Prof. C. J. Alexopoulos and Prof. G. W. Martin for naming the *Myxomycetes* and to Prof. J. H. Miller for help with the *Xylariaceae*.

An asterisk before a specific name indicates that I have not seen a previous record of the fungus from Venezuela.

MYXOMYCETES

The following collections have been determined by Prof. C. J. Alexopoulos, of Iowa:

Arcyria cinerea (Bull.) Pers., Syn. fung. 184 (1801)
1200 m., Cortada del Guayabo, Edo. Miranda, 9.7.1958, *Dennis* 1622.
1900 m., El Junquito, Dto. Federal, 10.6.1958, *Dennis* 1618.
800 m., on rotten logs, Guatopo Forest, Edo. Miranda, 26.6.1958.
Recorded among Fendler's fungi by Berkeley & Curtis and from Puerto Zamuro by Patouillard & Gaillard (1888), also by Chardon & Toro from the state of Carabobo.

Arcyria denudata (L.) Wettst. in Verh. Zool.-Bot. Ges. Wien **35**, 535 (1886)
800 m., on dead branches, Guatopo forest, Edo. Miranda, 22.6.1958.
Recorded by Chardon & Toro from the states of Aragua, Guarico, Miranda & Yaracuy.

Ceratiomyxa morchella* Welden in Mycologia **46, 94 (1954)
800 m., Guatopo forest, Edo. Miranda, 25.6.1958.

Comatricha subcaespitosa* Peck in Ann. Rep. New York State Museum **43, 71 (1890)
3550 m., on dead *Espeletia schultzii*, Laguna Mucubaji, Sierra de Santo Domingo, Edo. Mérida, 23.7.1958.

Craterium leucocephalum* (Pers.) Ditmar in Sturm, Deutschlands Flora, Pilze **1, 21 (1813)
900 m., Botanic Garden, Caracas, on dead leaves & twigs, 20.6.1958; 30.6.1958; 12.7.1958.
1200 m., on rotting grass, slope of La Silla above Los Palos Grandes, Edo. Miranda, 29.6.1958, *Dennis* 1639.

Diachea leucopodia (Bull.) Rost., Monogr. 190 (1874)
2000 m., El Avila, Dto. Federal, 22.6.1958; 950 m., on *Musa*, Botanic Gardens, Caracas, Dto. Federal, 30.6.1958, *Dennis* 1638.
Recorded by Chardon & Toro from the state of Miranda near Caracas.

**Dictydiaethalium plumbeum* (Schum.) Rost. in Lister, Mycetozoa 157 (1894)
900 m., on bark, Botanic Garden, Caracas, 12.7.1958.

Dictydium cancellatum (Batsch) Macbr., North Amer. Slime-Moulds 172 (1899)
900 m., on wood, Botanic Garden, Caracas, 30.6.1958, *Dennis* 1649B.
Recorded by Chardon & Toro from near Valencia in the state of Carabobo.

Diderma hemisphaericum* (Bull.) Hornem., Fl. Danica **33, 13 (1829)
900 m., on *Arundo donax* etc., Botanic Garden, Caracas, 30.6.1958, *Dennis* 1628; 12.7.1958.
c. 1500 m., on rotting *Rubus*, slope of La Silla above Los Palos Grandes, Edo. Miranda, 13.7.1958.

Didymium clavus* (Alb. & Schw.) Rabenh., Deutsch. Krypt.-Flora **1, 280 (1844)
900 m., Botanic Garden, Caracas, Dto. Federal, 19.6.1958, *Dennis* 1630.
3550 m., on rotting *Espeletia schultzii* and on cow-dung, Laguna Mucubaji, Sierra de Santo Domingo, Edo. Mérida, 22.7.1958, *Dennis* 1861; 25.7.1958, *Dennis* 2343; 2.8.1958, *Dennis* 1862.

**Didymium dubium* Rost. Monogr. 152 (1874)
4000 m., on living leaves of *Draba cheiranthoïdes* var. *leiocarpa*, crest of the Sierra de Santo Domingo, south of Mucubaji, Edo. Mérida, 3.8.1958, *Dennis* 1859.

Didymium nigripes (Link) Fries, Syst. myc. 3, 119 (1829)
900 m., on dead leaves, Botanic Garden, Caracas, Dto. Federal, 20.6.1958, *Dennis* 1620.

Described by Patouillard & Gaillard (1888) from Puerto Zamuro under the name *D. tenue*.

Fuligo septica (L.) Weber; Wiggers Prim. Fl. Holsat. 112 (1780)
3440 m., on bark, Laguna negra, Sierra de Santo Domingo, Edo. Mérida, 31.7.1958.

Listed by Berkeley & Curtis among Fendler fungi, as *Æthalium septicum* Fries and sent to Kew from Caracas by Ernst in 1882. Recorded by Patouillard & Heim from Guasdualito, Edo. Apure.

**Hemitrichia stipitata* (Massee) Macbr., North Amer. Slime-Moulds 207 (1899)
900 m., on wood, Botanic Garden, Caracas, Dto. Federal, 30.6.1958, *Dennis* 1649A.
1200 m., Cortada del Guayabo, Edo. Miranda, 9.7.1958.

Lycogala epidendrum (L.) Fries, Syst. Myc. **3**, 80 (1829)
200 m., dead wood in coffee plantation, Chichiriviche, Dto. Federal, 6.7.1958, *Dennis* 1626.
1200 m., Cortada del Guayabo, Edo. Miranda, 9.7.1958, *Dennis* 1622A.
3550 m., on dead *Espeletia schultzii*, Mucubaji, Sierra de Santo Domingo, Edo. Mérida, 24.7.1958.

Recorded by Patouillard & Gaillard from Cano del infierno and by Chardon & Toro from Maracay in the state of Aragua.

**Perichaena depressa* Libert, Pl. Crypt. 378 (1837)
900 m., Botanic Garden, Caracas, Dto. Federal, 14.7.1958.

Physarella oblonga* (Berk. & Curt.) Morgan in Journ. Cinn. Soc. Nat. Hist. **19, 7 (1896)
900 m., on wood, Botanic Garden, Caracas, Dto. Federal, 1.7.1958.

Physarum bivalve* Pers. in Ann. Bot. Usteri **15, 5 (1795)
900 m., on dead leaf, Botanic Garden, Caracas, Dto. Federal, 30.6.1958, *Dennis* 1648A.

Physarum bogoriense* Racib. in Hedwigia **37, 52 (1898)
800 m., on dead leaf, Guatopo forest, Edo. Miranda, 26.6.1958, *Dennis* 1632.
900 m., on living leaves etc., Botanic Garden, Caracas, 3.7.1958, *Dennis* 1627; 12.7.1958, *Dennis* 1650.

**Physarum compressum* Alb. & Schw., Conspect. fung. 97 (1805)
900 m., on *Arundo donax*, Botanic Garden, Caracas, Dto. Federal, 30.6.1958, *Dennis* 1629.

**Physarum globuliferum* (Bull.) Pers., Syn. fung. 175 (1801)
800 m., on dead *Cecropia* leaf, Guatopo forest, Edo. Miranda, 25.6.1958.

Physarum javanicum* Racib. in Hedwigia **37, 53 (1898)
800 m., on dead leaf, Guatopo forest, Edo. Miranda, 26.6.1958, *Dennis* 1634.

Physarum oblatum* Macbr. in Bull. Nat. Hist. Univ. Iowa **2, 384 (1893)
900 m., on dead *Agave* leaf, Botanic Garden, Caracas, Dto. Federal, 19.6. 1958, *Dennis* 1624.

Physarum viride (Bull.) Pers. in Ann. Bot. Usteri **15**, 6 (1795)
800 m., on bark in Guatopo forest, Edo. Miranda, 23.7.1958.

Recorded by Patouillard & Gaillard from Puerto Zamuro as *Tilmadoche mutabilis* Rost. var. *aurantiaca* Rost. and by Chardon & Toro from about 1800 m. in the state of Mérida.

Stemonitis flavogenita* Jahn in Verh. Bot. Ver. Brand. **45, 165 (1904)
900 m., Botanic Garden, Caracas, 14.7.1958.

Tubifera microsperma* (Berk. & Curt.) G. W. Martin in Mycologia **39, 461 (1947)
200 m., on logs in coffee plantation, Chichiriviche, Dto. Federal, 6.7.1958, *Dennis* 1625.
900 m., Botanic Garden, Caracas, Dto. Federal, 14.7.1958.

Fendler 227 was named by Rostafinski *Physarum leveillei* Rost. β *auripes* Rost and is regarded by the Listers as a form of *P. citrinum* Schum. Fendler 224 was determined by Rostafinski as his *Stemonitis dictyospora* and by A. Lister as *S. fusca* Roth var. *trechispora* Torrend.

PHYCOMYCETES

PYTHIACEAE

Phytophthora infestans (Mont.) de Bary in Journ. Roy. Agr. Soc., Ser. 2, **12**, 239 (1876)
c. 3300 m., on cultivated *Solanum tuberosum*, Hacienda La Corcovada, Sierra de Santo Domingo, Edo. Mérida, 29.7.1958, *Dennis* 2527.

ALBUGINACEAE

Cystopus ipomoeae-panduratae (Schw.) Stev. & Swingle in Trans. Kansas Acad. Sci. **2**, 67 (1889)
c. 1500 m., on *Ipomoea* sp., Rio Chama valley below Mérida, Edo. Mérida, 20.7.1958, *Dennis* 1849.

Cystopus portulacae (DC.) Lev. in Ann. Sci. Nat., Bot. Sér. 3, **8**, 371 (1847)
c. 1000 m., on *Portulaca oleracea*, Los Palos Grandes (Caracas), Edo. Miranda, 29.6.1958, *Dennis* 1491.

PERONOSPORACEAE

Plasmopara halstedii* (Farl.) Berl. & de Toni in Saccardo, Syll. fung. **7, 242 (1888)
1500 m., on *Bidens* sp., Rio Chama valley, Mérida, Edo. Mérida, 20.7.1958, *Dennis* 2101.

ENDOGONACEAE

Endogone pulvinata P. Henn. in Hedwigia **36**, 212 (1897)
On soil, Caracas, Dto. Federal, leg. Gollmer, part of type collection in Herb. Sydow, Stockholm; Botanic Garden, Caracas, 2.7.1958, *Dennis* 1250; 10.7.1958, *Dennis* 1250A.

EUMYCETES

TAPHRINACEAE

Taphrina filicina Rostr. var. **polystichi-aculeati** *Dennis*, var. nov.

Mycelio inter cuticulam et epidermidem frondis crescente, bullas parvas formante; ascis in bullarum pagina superiore et inferiore insidentibus, clavatis, apice rotundatis vel truncatis, deorsum attenuatis, 36–55 × 8–9μ, parte basali attenuata, 4–6μ crass; ascosporis saepe octonis, ovoideis, 5–7 × 2·5–3·5μ. Fig. 1.

Fig. 1. *Taphrina filicina* var. *polystichi-aculeati*. Asci and subcuticular ascogenous cells × 660, diagrammatic section of two small galls showing distribution of ascogenous cells

Hab. in frondibus vivis *Polystichi aculeati*, 3440 m., Laguna negra, Sierra de Santo Domingo, Edo. Mérida, 27.7.1958, *Dennis & Buza* 2080 (typus).

The light yellowish-green galls, mostly up to 1 cm. across, a few larger, perhaps by fusion, are conspicuous on the dark green fronds of the fern. An almost continuous layer of ascogenous cells develops between the cuticle and the epidermal cells. These grow out to form the asci and I have been unable to demonstrate a septum cutting off a basal cell from the mature ascus. In this and in the structure of the gall this fungus agrees with *T. filicina* rather than with *T. polystichi* Mix. *T. filicina* is, however, so far known with certainty only as a parasite of *Dryopteris spinulosa* and its varieties, so, in view of the narrow host-range of the majority of *Taphrina* species, it seems desirable to treat the parasite of *P. aculeatum* as at least a distinct variety.

PEZIZACEAE

Peziza ampliata* Pers., Mycologia europaea **1, 227 (1822)

3550 m., on rotting *Espeletia schultzii*, Laguna Mucubaji, Sierra de Santo Domingo, Edo. Mérida, 23.7.1958, *Dennis* 1717; 25.7.1958, *Dennis* 1717A.

Apothecia about 3 cm., cupshaped, with thick and somewhat hygrophanous flesh stratified in 4 zones, a compact subhymenium, a large-celled zone, a darker belt of small cells and hyphae and an external large-celled zone. In the second and fourth zones the thin-walled subglobose cells measure from 60–90μ across. Ascospores smooth, nonguttulate, 16–18 × 9–10·5μ, a little smaller than those of *P. ampliata* in Europe, 16–20 × 9–11μ (Le Gal 1941).

**Peziza vesiculosa* Bull. ex Saint-Amans, Flore Agenaise 534 (1821)
3700 m., on cow-dung, second corrie of Sierra de Santo Domingo, south of Mucubaji, Edo. Mérida, 25.7.1958, *Dennis* 2430, ascospores smooth. 21–22 × 11–12μ.

HUMARIACEAE

**Aleuria aurantia* (Pers. ex S. F. Gray) Fuck. in Jahrb. Nass. Ver. Nat. 223/4, 325 (1870)
2100 m., roadside along crest of El Avila, Dto. Federal, 13.6.1958, *Dennis* 1047; 17.6.1958, *Dennis* 1047A; 3550 m., amongst moss beside the road, Mucubaji, Sierra de Santo Domingo, Edo. Mérida, 26.7.1958, *Dennis* 2431.

Aleuria bicucullata* Boud. in Bul. Soc. Bot. France **28, 93 (1881)
c. 2000 m., on bare sandy soil, west ridge of El Avila, Dto. Federal, 17.8.1958, *Dennis* 1806.

Aleuria rutilans (Fr.) Gillet, Discomycètes 53 (1879)
2100 m., mossy bank in forest, La Mucuy, Sierra Nevada, Edo. Mérida, 4.8.1958, *Dennis* 2378; 3450 m., amongst small mosses near Laguna negra, 1.8.1958, *Dennis* 2453; 3550 m., on mossy soil, Laguna Mucubaji, Sierra de Santo Domingo, Edo. Mérida, 22.7.1958; 26.7.1958, *Dennis* 2372, 2434.
Collected by Chardon & Toro between 3400 and 4000 m. in the mountains of Mérida.

**Aleuria vivida* (Nyl.) Gillet, Discomycètes 54 (1879)
3300 m., on bare soil with *Polytrichum*, Hacienda La Corcovada, Sierra de Santo Domingo, Edo. Mérida, 30.7.1958, *Dennis & Buza* 1805.

**Lamprospora carbonicola* Boud., Hist. Classif. Discom. d'Europe 68 (1907)
c. 2600 m., among mosses on soil near summit of La Silla, Dto. Federal, 4.7.1958, *Dennis* 1179, ascospores smooth, 12–13μ, with one large guttule, paraphyses straight, 3–4μ wide at the tips.

Lamprospora tuberculatella* Seaver in Mycologia **6, 15 (1914)
3440 m., in wet moss, Laguna negra, Sierra de Santo Domingo, Edo. Mérida, 31.7.1958, *Dennis* 2454.

**Pulvinula globifera* (Berk. & Curt.) Le Gal, Discom. de Madagascar 94 (1954)
800 m., roadside bank, Guatopo, Edo. Miranda, 22.6.1958, *Dennis & Aristeguieta* 1178.

**Phaedropezia flavida* (Berk. & Curt.) Le Gal, Discom. de Madagascar 185 (1954)
c. 200 m., on soil, Chichiriviche, Dto. Federal, 6.7.1958, *Dennis & Aristeguieta* 1295.

**Anthracobia maurilabra* (Cooke) Boud., Hist. Classif. Discom. d'Europe 65 (1907)
3440 m., on charred wood of *Gynoxis moritziana*, Laguna negra, Sierra de Santo Domingo, Edo. Mérida, 1.8.1958, *Dennis* 2456.

**Cheilymenia coprinaria* (Cooke) Boud., Hist. Classif. Discom. d'Europe 63 (1907)
c. 3500 m., on dung at fringe of the paramo, Sierra Nevada opposite Mérida, Edo. Mérida, 19.7.1958, *Dennis* 1835, ascospores 16–17 × 8–10μ, hairs up to 750μ.

***Cheilymenia raripila** (*Phil.*) *Dennis*, comb. nov.
Ascobolus raripilus Phil. in Grevillea **7**, 23 (1878)
3560 m., on horse-dung near Laguna Mucubaji, Sierra de Santo Domingo, 1958, *Dennis* 2382; 3700 m., on cow-dung, second corrie of Sierra de Santo Domingo south of Mucubaji, Edo. Mérida, 25.7.1958, *Dennis* 2430A.

Differs from the common *C. coprinaria* in its larger ascospores, 25–27 × 12–12·5μ and shorter hyaline hairs.

Coprobia granulata (Bull. ex Mérat) Boud., Hist. Classif. Discom. d'Europe 69 (1907)
Humaria gollmeri P. Henn. in Hedwigia **36**, 233 (Aug. 1897)
On cow-dung near Caracas, Dto. Federal, leg. Gollmer.

From the diagnosis one might guess *H. gollmeri* to have been based on immature material of some *Ascobolus* but the portion of the type now in the Sydow herbarium at Stockholm is typical *C. granulata*, with mature hyaline ascospores. The fungus was collected on the same substrate by Chardon & Toro at El Hatillo, Edo. Miranda and at about 1750 m. in the Edo. Trujillo. It is unfortunate that Mérat, in validating the name after 1st January 1821, called the fungus *Peziza granulosa* Bull., citing the figure which Bulliard had published as *P. granula'a*. I regard this as an accidental error which does not require a change in this well established specific epithet.

ASCOBOLACEAE

Ascobolus furfuraceus Pers. ex Hook., Fl. Scotica **2**, 33 (1821)
3550 m., on cow-dung, Laguna Mucubaji, Sierra de Santo Domingo, Edo. Mérida, 2.8.1958, *Dennis* 2411, all the apothecia are unfortunately immature, without coloured ascospores. Det. J. van Brummelen.

On the same substrate in the paramos of Mérida, Chardon & Toro collected a fungus determined by Seaver as '*Ascobolus stercorarius* (Bull.) Schroet.', a collective species.

Ascophanus carneus (Pers. ex Fr.) Boud. in Ann. Sci. Nat., Bot. Sér. 5, **10**, 250 (1869)
3550 m., on cow-dung, Laguna Mucubaji, 2.8.1958, *Dennis* 2409; 3560 m., on crown of dead *Espeletia schultzii*, valley south of Mucubaji, Sierra de Santo Domingo, Edo. Mérida, 23.7.1958, *Dennis* 2383.

Collected by Chardon & Toro on cow-dung at c. 1750 m. in the state of Trujillo.

Lasiobolus oligotrichus* A. L. Smith & Ramsb. in Trans. Brit. Mycol. Soc. **5, 238 (1916)
3550 m., on cow-dung, Laguna Mucubaji, Sierra de Santo Domingo, Edo. Mérida, 2.8.1958, *Dennis* 2410.

This may be only a depauperate state of *L. equinus* (Mull.) Karst., collected by Chardon & Toro on horse-dung at Laguna negra, about 2 miles from the above locality.

Saccobolus neglectus* Boud. in Ann. Sci. Nat., Bot. Sér. 5, **10, 231 (1869)
3550 m., on cow-dung, Laguna Mucubaji, Sierra de Santo Domingo, Edo. Mérida, 2.8.1858, *Dennis* 2413.

Apothecia gray, 200–400μ diameter, spore mass 40 × 14μ, individual ascospores 15–16 × 7μ.

SARCOSCYPHACEAE

Cookeina sulcipes (Berk.) Kuntze, Rev. Gen. Pl. **2**, 849 (1891)
c. 800 m., on dead branch on forest floor, Guatopo, Edo. Miranda, 27.6. 1958, *Dennis* 1196.

Collected by Chardon & Toro in the states of Guarico and Yaracuy, by Gaillard (as *Peziza hindsii* Berk.) at San Fernando and by Grisol at Guasdualito.

Cookeina tricholoma (Mont.) Kuntze, Rev. Gen. Pl. **2**, 849 (1891)
c. 400 m., on rotting logs in coffee plantation, Chichiriviche, Dt. Federal, 6.7.1958, *Dennis & Aristeguieta* 1176; c. 800 m., on dead wood in forest, Guatopo, Edo. Miranda, 22.6.1958, *Dennis* 1177.

There is also material of the species at Instituto Botanico, Caracas, from Raudal Auraima, Rio Paragua, Guayana, July 1943, *F. Cardona* 728. It was collected by Chardon & Toro in the states of Guarico & Tachira and by Gaillard 'sur tout le cours de l'Orenoque'.

**Phillipsia carnicolor* Le Gal, Discom. de Madagascar 418 (1954)
900 m., on dead wood on the ground, Botanic Garden, Caracas, 14.7.1958, *Dennis* 1663.

Phillipsia domingensis (Berk.) Berk. in Journ. Linn. Soc. Bot. **18**, 388 (1881)
c. 800 m., solitary on log in dense forest, Guatopo, Edo. Miranda, 27.6.1958, *Dennis* 1115.

Collected by Chardon & Toro in Guarico & Yaracuy.

**Plectania* cf. *lilliputiana* Le Gal, Discom. de Madagascar 307 (1954)
900 m., on dead rootlet on mossy bank, Botanic Garden, Caracas, 1.7.1958, *Dennis* 1293, apothecium 2·5 mm. diameter, sessile, disc bright red, margin entire, asci 300–320 × 14–15μ, 8-spored, ascospores elliptical to elliptic cylindric, 16 × 14, 17 × 11, 19 × 11–14, 20 × 10–12, 21 × 13, 22 × 12–13, 23 × 11·5μ, paraphyses cylindrical, anastomosing, 2–3μ thick.

This differs from the description of *P. lilliputiana* in its larger apothecium and it is difficult to assess the importance of this character since there were only three apothecia in the type collection and only one in *Dennis* 1293.

SCLEROTINIACEAE

Lambertella boliviana* Dennis in Kew Bull. **13, 458 (1959)
2000 m., on dead leaf in cloud forest, El Avila, Dto. Federal, 17.6. 1958, *Dennis* 1218.

**Martinia panamaensis* Whetzel in Mycologia 34, 586 (1942)
1200 m., on wet bark of rotting log, Cortada del Guayabo, Edo. Miranda, 9.7.1958, *Dennis* 1183. The minute sclerotia occur on the inner surface of the sodden bark while the apothecia emerge on the outer surface.

FIG. 2. *Rutstroemia niphogetonis*. Habit sketch natural size, section of margin and portion of excipulum × 660.

***Rutstroemia niphogetonis** *Dennis*, sp. nov.

Apothecia solitaria, superficialia, stipitata, ad 7 mm. lata, ochraceo-brunnea, excipulo prosenchymatice contexta, stipite glabro, levi, aequali, fuligineo-fusco; ascis clavatis, pedicellatis, 160–170 × 13μ, octosporis, J-; ascosporis distichis, ellipsoideis, continuis, hyalinis, dein 1-septatis. Paraphyses filiformes, 1μ, ad apicem 2μ latae.

Apothecia solitary or in pairs, disc slightly concave, ochraceous tawny, up to 7 mm. diameter, receptacle shallow cupshaped, concolorous, smooth, becoming paler and longitudinally wrinkled when dry; stalk slender, smooth, dark brown. Flesh thick, soft, composed of rather closely woven

non gelatinised hyphae 2–3μ wide; excipulum about 50μ thick, formed of branched septate hyphae, with lumen 2–3μ wide and thick, hyaline, gelatinised walls, lying mostly almost parallel to the surface but with a few curving downwards from the flesh towards the surface. Asci cylindric-clavate, obtuse, 160–170 × 13μ, the pore not blued by Melzer's reagent; ascospores biseriate, elliptical, smooth, hyaline, biguttulate, 18–24 × 7–8μ, becoming 1-septate after extrusion from the ascus but not budding off secondary spores. Paraphyses very abundant, slender, 1μ thick, enlarged above to 2μ. Fig. 2.

On petiole-bases of dead *Niphogeton dissecta* in boggy ground, c. 3800 m., highest corrie at the head of the valley south of Mucubaji, Sierra de Santo Domingo, Edo. Mérida, 24.7.1958, *Dennis & Buza* 1721 (typus); same locality, 25.7.1958, *Dennis* 1721B.

***Rutstroemia espeletiae** *Dennis*, sp. nov.

Apotheciis sparsis, superficialis, stipitatis, griseis, cupulatis applanatisque, ad 10 mm. diametro, hypothecio prosenchymatico, fuscidulo, excipulo parenchymatico; asci clavati, octospori, 80–90 × 6μ, J+; ascosporis distichis, subcylindraceis, 6–8 × 2·5μ; paraphysibus simplicibus, filiformibus, ad apices 2·0–2·5μ diametro, ascis aequantibus. Fig. 3, p. 432.

In caudicis emortuis *Espeletiae*, 3700 m., Sierra de Santo Domingo, Edo. Merida, 25.7.1958, *Dennis & Buza* 2435 (typus).

The large apothecia, with dark grey discs and paler receptacles, were abundant inside dead hollow stems.

Rutstroemia macrospora* (Peck) Kanouse in Canad. Journ. Res. **18, 547 (1940)
2000 m., on decorticated wood in cloud-forest, El Avila, Dto. Federal, 13.6.1958, *Dennis* 1217A; 17.6.1958, *Dennis* 1217.

I have previously collected this common North American fungus at a similar altitude in the Blue Mountains of Jamaica.

Chlorosplenium brasiliense* Berk. & Cooke in Journ. Linn. Soc. Bot. **15, 397 (1876)
c. 1900 m., on green-stained wood in cloud-forest east of Hotel Humboldt, El Avila, Dto. Federal, 5.7.1958, *Dennis* 1195; 2000 m., El Avila, 13.6.1958, *Dennis* 1370A.

This differs from the well-known *C. aëruginascens* Nyl. in its smaller asci, 35–46 × 4μ, and ascospores, 4–6 × 0·75–1·0μ.

HELOTIACEAE

Calycella citrina (Hedw. ex Fr.) Quél., Enchiridion fung. 300 (1886)
3440 m., on decorticated wood, Laguna negra, Sierra de Santo Domingo, Edo. Mérida, 1.8.1958, *Dennis* 2385. Collected by Chardon & Toro at 1750–1850 m. in the Sierra Nevada de Mérida.

Calycella sulfurina* (Quél.) Boud. var. **triseptata *Dennis*, var. nov. a typo differt sporis majoribus, triseptatis.

In culmis Bambusae, 1900 m., El Avila, Dto. Federal, 4.7.1958, *Dennis* 1198 (typus).

This collection bears a close superficial resemblance to *C. sulfurina* var. *sulfurina* and, like it, is associated with stromatic fungi but its ascospores are larger, 13–17 × 2·5μ and become 3-septate instead of 1-septate.

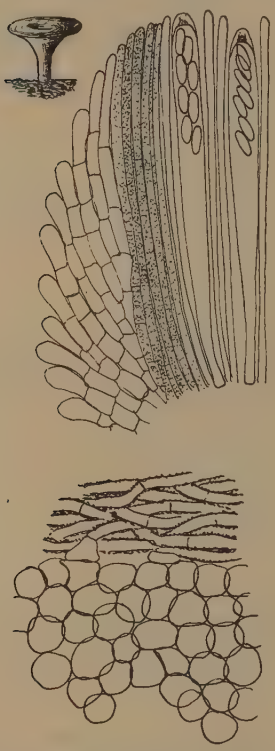


Fig. 3. *Rutstroemia espeletiae*. Apothecium natural size, section of margin and portion of excipulum × 660

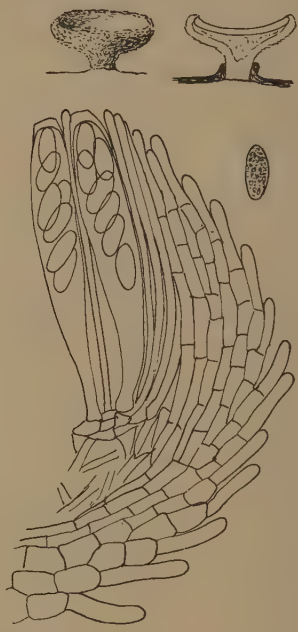


Fig. 4. *Helotium lasseri*. Apothecium and section × 15, section of margin and spore × 660

**Helotium calyculus* (Sow. ex Fr.) Fr., Summa Veg. Scand. Sect. Post. 355 (1849)

c. 3700 m., on dead sticks on the ground, second corrie of the Sierra de Santo Domingo south of Mucubaji, Edo. Mérida, 25.7.1958, *Dennis & Buza* 2452. Stipe long, slender, minutely downy, asci 140 × 10μ, pore not blued by Melzer's reagent, ascospores 16–19 × 4–5μ.

Helotium caracassensis Dennis in Kew Bull. **9**, 324 (1954)

c. 300 m., on dead leaf in coffee plantation, Chichiriviche, Dto. Federal, 6.7.1958, *Dennis* 1221; 1200 m., on dead leaf of *Mangifera indica*, Cortada del Guayabo, Edo. Miranda, 9.7.1958, *Dennis* 1180.

***Helotium lasseri** *Dennis*, sp. nov.

Ascomatibus sparsis, stipitatis, 1 mm. latis, 0·5 mm. alt., disco concavo, pallido, extus albido-pruinosis, prosenchymatice contextis; ascis clavatis,

apice truncatis, incrassatis, jodo immutatis, octosporis, 70–85 × 10–11μ; ascosporis mono- vel distichis, ovoideis, hyalinis, 10–12 × 4μ; paraphysibus filiformibus, 2μ crassis. Ad folia et ramulos aridos, 2000 m., El Avila, Dto. Federal, 17.8.1958, *Dennis* 1814 (typus). Fig. 4.

This is certainly not a typical *Helotium* but it is difficult to find a more appropriate genus for it. The flesh is composed of very loosely woven fragile hyphae, so brittle that the hymenium tends to separate from the receptacle on drying. The excipular hyphae are soft and thinwalled, 5μ wide and parallel to the surface in the inner layers, curving outwards and becoming broader and short-celled to give an almost parenchymatic appearance to the outer layers. They terminate in short, thinwalled, cylindrical hairs, about 20 × 4μ like those of many species of *Pezizella*, which give the minutely downy appearance to the receptacle. The substrate was a small Melastomaceous tree, felled and left to decay in the cloud forest.

Helotium gregarium Boud. seems sufficiently distinguished by its capitate paraphyses, *H. alboatrum* P. Henn. by its black stalk and *H. angelense* Starb. by its longer asci with the ascus pore blued by iodine.

***Strossmayeria phaeocarpa** *Dennis*, sp. nov.

Apothecia dispersa, superficialia, sessilia, urceolata, 0·25–0·50 mm. lata, nigro-brunnea, disco pruinoso, griseo-brunneo, excipulo prosenchymatice contexto. Ascis oblongo-clavatis, octosporis, 80 × 10–11μ, obturaculo jodo coeruleo tincto; ascosporis elliptico-fusoideis, rectis, transverse 3-septatis, hyalinis dein brunneis, 20–22 × 4–4·5μ; paraphysibus hyalinis. Fig. 5, p. 434.

Ad culmos emortuos in sylvis, 2000 m., El Avila, Dto. Federal, 17.8.1958, *Dennis* 1817 (typus).

Apothecia superficial on a brown mycelium, apparently belonging to a mixture of Dematiaceous moulds including a species of *Helminthosporium*. Disc flat, pruinose, receptacle sessile on a broad base, very dark brown with a paler margin, pruinose, fragile; excipulum thin, formed of parallel hyphae 4μ wide, with thick, smooth, brown walls; base a pseudoparenchymatic disc of small, isodiametric, thickwalled, brown cells; flesh fragile, of slender, closely packed, branched hyphae vertically arranged. Asci short-stalked, rather thickwalled; ascospores biseriate, hyaline or nearly so when examined fresh but distinctly brownwalled in dried material; paraphyses cylindrical, obtuse, 3μ thick, not forming an epithecium. On dead 'bamboo' culms.

The structure is Durelloid but the texture is too fragile for a typical *Durella* and there is no tendency for the paraphyses to cohere in an epithecium. The closest affinity appears to be with *Leptobelonium vexatum* von Höhnel, described from bamboo in Java, with very similar but hyaline ascospores 22 × 4–6μ and longer stalked asci, 110–120 × 10–12μ. The type species of *Leptobelonium* was similarly parasitic on a *Helminthosporium* but had an excipulum composed of light coloured hyphae. Regarding the systematic position of *L. vexatum* von Höhnel wrote: 'Er ist jedenfalls ein schwierig zu bestimmende Pilz, der leicht für ein ganz stielloses *Helotium* gehalten werden kann, indess, wie der Vergleich mit *Leptobelonium helminthicola* (Blox.) Höhn. zeigt, von der Gattung *Leptobelonium* Höhn. wesentlich nur durch die etwas derbwandigen Hyphen, die grosserzellige Basalschichte und die Jodreaktion des Porus abweicht. Die nahe Verwandtschaft der beiden

Pilze ist unverkennbar, weshalb die vorliegende neue Art zu *Leptobelonium* gestellst wurde.' I accordingly feel it best to refer my 1817 to this same genus but using the generic name *Strossmayeria* Schulzer, which Nannfeldt has shown to be an earlier synonym of *Leptobelonium*, possibly even based on the same type species. *Manilaea* Syd., which was described as having a somewhat similar structure but with thickwalled asci and an epithecium, has been shown by Nannfeldt to have been based on an *Arthonia*!

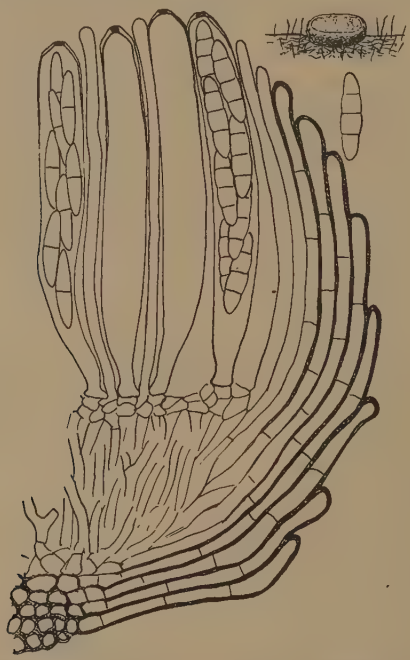


Fig. 5. *Strossmayeria phaeocarpa*. Apothecium × 20, section of margin and spore × 660

Lasseria *Dennis*, nov. gen.
Apothecia immersa dein erumpentia, margine albo, minute fimbriato; disco laeticolore; excipulo contextu prosenchymatico. Asci cylindracei, octospori, paraphysati. Sporidia hyalina, oblonga, continua.

Lasseria chrysophthalma *Dennis*, sp. nov.
Apothecia gregaria, rotundata vel elongata, disco 0·5–1·0 mm. diametro, 'Flame scarlet' (Ridgway), ascis cylindraceis apici truncato rotundatis, incrassatis, 135 × 7μ, jodo non coerulescentibus; sporidiis moncstichis, oblongis, utrinque rotundatis, rectis, hyalinis, 10–12 × 3–4μ, 2-guttulatis; paraphysibus filiformi-clavatis 2μ crassis. 2500 m., in ligno decorticato vetusto, La Silla, Dto. Federal, 4.7.1958, *Dennis* 1184 (typus). Fig. 6.

Apothecia scattered, immersed, becoming erumpent, finally almost superficial and easily detached from the substrate, broadly elliptical or almost circular, at first enclosed in the white excipulum which tears apart to expose the reddish-orange disc. Excipulum composed of slender parallel hyphae,

those next to the hymenium light yellow, the remainder curved outwards, hyaline and enclosing numerous irregularly rounded masses of mineral matter which give the powdery white aspect to the margin under a hand lens. Asci cylindrical, obtusely rounded, short-stalked, not at all blued by Melzer's reagent; ascospores elliptic-cylindric, with two conspicuous guttules; paraphyses only very slightly enlarged towards the rounded tip, longer than the asci but not forming a coherent epithecium.

FIG. 6. *Lasseria chrysophthalma*, section of margin × 660

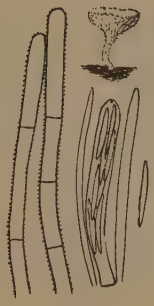


FIG. 7. *Dasyscyphus albidulus* var. *longisporus*. Apothecium × 10, hairs, ascus, paraphyses and spore × 660

Lasseria differs from *Propolis* in the unbranched tips of the paraphyses and erumpent apothecia. In aspect it resembles *Duebenia* but has a different excipular structure. *Phacidiella* differs in having a dark stromatic tissue adherent to overlying bark, *Laqueria* also is at first closed by a black parenchymatous tissue, while *Placographa* is dark coloured and has asci blued by iodine.

HYALOSCYPHACEAE

Dasyscyphus albidulus* Penz & Sacc. var. **longisporus *Dennis*, var. nov., a typo differt ascosporis 14–19 × 1μ. Fig. 7.

Ad folia coriacea in sylvis, El Avila, Dto. Federal, 17.6.1958, *Dennis* 1223 (typus).

1300 m., Los Guayaditos, Edo. Miranda, 8.6.1958, *Dennis & Foldats* 1339.

Dasyscyphus albidulus from Java was on a similar substrate and had similar stature, asci, paraphyses and hairs but ascospores only 8–9 × 1μ. Ascospore length is apt to vary considerably in species of this genus and I do not think the Venezuelan fungus worth more than varietal rank.

FIG. 8. *Dasyscyphus albidus* var. *americanus*. Apothecium × 10, ascus, paraphysis and hair × 660

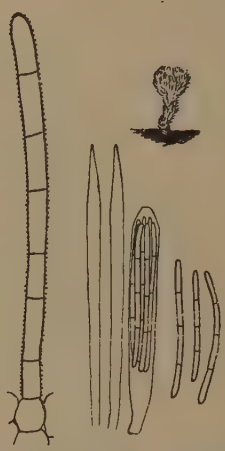


FIG. 9. *Dasyscyphus apalus* var. *polylepidis*. Apothecium × 10, hair, paraphyses, ascus and spores × 660

***Dasyscyphus albidus** (*Penz. & Sacc.*) *Dennis*, comb. nov.

var. **americanus** *Dennis*, var. nov.

Erinella albida Penz. & Sacc. in Malpighia 15, 218 (1901)

A typo differt disco luteo, paraphysibus multo majoribus, 200 × 3μ. Fig. 8.

In culmis putridis *Bambusae*, c. 1900 m., El Avila, Dto. Federal, 4.7.1958, *Dennis* 1201 (typus).

Dennis 1201 has asci 170 × 11μ, with small pore not blued by Melzer's reagent and eight parallel ascospores 130–150 × 1·5–2μ. *Erinella albida*, from Java, agrees with it in most characters and was on a similar substrate but was described as being white throughout and as having scanty short paraphyses, only half as long as the asci. The paraphyses of *Dennis* 1201 are very abundant and narrowly lanceolate, a little longer than the asci as in most

species of the genus. *D. calosporus* (Pat. & Gaill.) Dennis, described on bark of living trees from the upper Orinoco, is very similar but probably distinct in its larger apothecia with broader more fusiform ascospores 75–130 × 3μ and ascus pore blued by iodine. The type of *Peziza patena* Lév., from Colombia, yields asci 130 × 10μ, with spores 80–90 × 1–2μ and may be a small state of *D. calosporus*.

Dasyscyphus andinus* (Pat.) Dennis in Kew Bull. **9, 312 (1954)
c. 3700 m., on dead leaf of *Espeletia schultzii*, second corrie in Sierra de Sto. Domingo south of Mucubaji, Edo. Mérida, 25.7.1958, *Dennis* 2434.

Dasyscyphus apalus* (Berk. & Br.) Dennis var. **polylepidis *Dennis*, var. nov. a typo differt ascosporis 25–30 × 1·25μ. Fig. 9.

Ad folia sicca *Polylepidis sericeae*, 3440 m., Laguna negra, Sierra de Sto. Domingo, Edo. Mérida, 27.7.1958, *Dennis* 2519 (typus).

The apothecia of this collection only differ from those of typical *D. apalus*, common on *Juncus*, in their smaller size and shorter ascospores. *Erinella polylepidis* Pat., from Ecuador, is presumably quite different as it was described as having 7-septate ascospores 45–50 × 4μ.

Dasyscyphus bambusinus* (Bres.) Dennis in Kew Bull. **9, 301 (1954)
c. 2000 m., on dead bamboo in cloud forest near Hotel Humboldt, El Avila, Dto. Federal, 4.7.1958, *Dennis* 1200; 1600 m., El Junquito, 11.6.1958, *Dennis & Foldats* 1268.

Dasyscyphus brasiliensis (Mont.) Le Gal Discom de Madagascar 372 (1954)
c. 950 m., on bark of dead branches, Rio Chacaito, Caracas, 18.11.1949, *Dennis* 236B; 200 m., cloud forest, El Avila, Dto. Federal, 17.6.1958; 13.6.1958, *Dennis* 1315; 1370.

It was probably this which Chardon & Toro collected as *Erinella longispora* (Karst.) Sacc. at El Hatillo, Edo. Miranda.

*?*Dasyscyphus carneolus* (Sacc.) Sacc. var. *longisporus* Dennis, Comm. Myc. Inst. Myc. Paper 32, 20 (1949)
c. 3700 m., on dead grass leaves, *Danthonia* sp., between the first and second corries of the Sierra de Santo Domingo, Edo. Mérida, 25.7.1958, *Dennis & Buza* 2449.
The material is rather poor but is at least closely allied to the above.

***Dasyscyphus espeletiae** *Dennis*, sp. nov.

Ascomatibus hypophyllis, subsolitariis, brevissime stipitatis, 0·5–1·0 mm. latis, margine leniter involuto, extus pilis simplicibus, copiosis, obtusus, septatis, rugosis, hyalinis, 100–130 × 2·5–3μ, dense puberulis; disco flavo-aurantiaco; ascis cylindraceo-clavatis, 36 × 4μ, octosporis, J−; ascosporis distichis, fusoideis, 6–9 × 1·5μ; paraphysibus lanceolatis, acutis, hyalinis, 3μ crassis. Fig. 10, p. 438.

In foliis vivis *Espeletiae humbertii*, 3440 m., Laguna negra, Sierra de Sto. Domingo, Edo. Mérida, 27.7.1958, *Dennis* 2386 (typus).

Dasyscyphus fimbriiferus* (Berk. & Curt.) Sacc., Syll. fung. **8, 452 (1889)
1900 m., on fragment of bamboo culm in cloud forest, El Avila, Dto. Federal, 4.7.1958, *Dennis* 1202. Though not on a fern stem this collection otherwise agrees so well with the typus from Cuba that I have no hesitation in referring it to the same species.

**Dasyscyphus lachnodermus* (Berk.) Rehm in 26 Berichte Naturhist. Vereins Augsburg, 761 (1881)
3440 m., on dead twigs of *Gynoxis moritziana*, Laguna negra, Sierra de Sto. Domingo, Edo. Mérida, 27.7.1958, 31.7.1958, *Dennis & Buza* 2400, 2432, Fig. 11; on dead *Espeletia* sp., c. 3700 m., Sierra de Santo Domingo, S. of Mucubaji, Edo. Mérida, 25.7.1958, *Dennis* 2520.

Dasyscyphus lasseri Dennis in Kew Bull. **9**, 309 (1954)
1600 m., on dead grass culms, El Junquito, Dto. Federal, 16.11.1949, *Dennis* 360.

FIG. 10. *Dasyscyphus espeletiae*. Apothecium × 10, hair, paraphysis, ascus and spore × 660

FIG. 11. *Dasyscyphus lachnodermus*. Apothecium × 10, hairs, paraphyses, asci and spores × 660

**Dasyscyphus nudipes* (Fuck.) Sacc. var. *minus* Dennis in Comm. Myc. Inst. Myc. Paper 32, 16 (1949)
2500 m., on dead leaves of *Orthrosanthus chimboracensis* (*Iridaceae*), in boggy ground near summit of La Silla, Dto. Federal, 4.7.1958, *Dennis* 1476; 3440 m., on same substrate, Laguna negra, Sierra de Sto. Domingo, Edo. Mérida, 26.7.1958, *Dennis* 2448.

Dasyscyphus pygmaeus* (Fr.) Sacc., Syll. fung. **8, 436 (1889)
c. 1100 m., on grass roots, southern slope of La Silla, above Los Palos Grandes, Edo. Miranda, 13.7.1958, *Dennis* 2380.

Dasyscyphus subcorticalis* (Pat.) Dennis in Kew Bull. **9, 299 (1954)
c. 1000 m., on bark of stump, Quebrada Teneria, Los Chorros, Edo. Miranda, 15.6.1958, *Dennis* 1369.

Dasyscyphus* cf. *varians* Rehm in Hedwigia **39, 94 (1900)
c. 800 m., on tree fern petioles, Guatopo, Edo. Miranda, 25.6.1958, *Dennis* 2373.

This ample collection has light yellow apothecia about 250μ across, with the hairs thinwalled, granulate, mostly 2-septate, 30–50 × 3·5–5μ, contents oily and yellow; asci 40–45 × 5–6μ, ascospores biseriate, elliptic-cylindric, 8–9 × 2μ, mostly with 4 guttules; paraphyses lanceolate, 2μ wide. *D. varians* typically has longer hairs and slightly more slender spores but I doubt the wisdom of describing a new species from such small differences observed in a single collection.

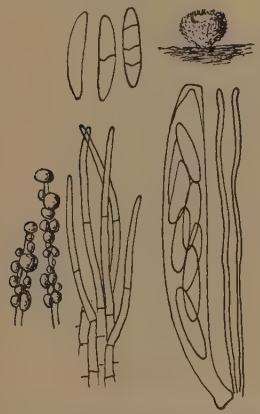


FIG. 12. *Hyaloscypha sulfurina*. Apothecium × 20, hairs, ascus, paraphyses and spores × 660

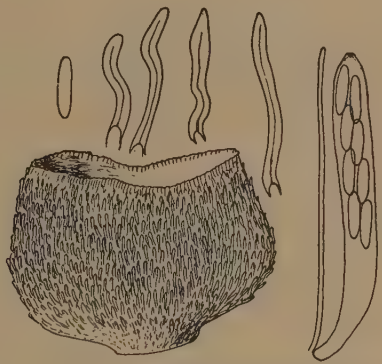


FIG. 13. *Unguicularia digitalincola*. Apothecium × 100, spore, hairs, paraphysis and ascus × 660

Other species of *Dasyscyphus* already recorded from Venezuela are *D. calosporus* (Pat. & Gaill.) Dennis, *D. mapirianus* (Pat. & Gaill.) Dennis, *D. orinocensis* (Pat. & Gaill.) Dennis, '*Erinella*' *guaranitica* (Speg.) Pat. & Gaill. and '*E.*' *aturensis* Pat. & Gaill., all from the Orinoco, and *D. rhaphidophorus* (Berk. & Curt.) Dennis, probably from Colonia Tovar.

***Hyaloscypha sulfurina** *Dennis*, sp. nov.

Apothecia sparsa, globosa dein cupulata, 0·3 mm. diam., sulphureo-villosa. Pili 30–40 × 2μ, sursum attenuati, recti, 2–3-cellulares. Asci clavati, 65–70 × 9μ, octospori. Ascosporae ellipticae, 15–20 × 3–4μ. Paraphyses filiformes. Fig. 12.
In foliis putridis *Espeletiae*, 2700 m., Sierra de Santo Domingo, Edo. Mérida, 25.7.1958, *Dennis* 2437 (typus).

The apothecia bear a superficial resemblance to those of *Dasyscyphus cerinus* (Pers. ex Fr.) Fuck. and *D. melaxanthus* (Fr.) Massee. Of these, the former is a good *Dasyscyphus*, with cylindrical granulate hairs, whereas *D. melaxanthus*, with encrusted yellow hairs rather like those of *Dennis* 2437 but nonseptate, is a *Hyaloscypha*. The hairs of *H. sulfurina* are encrusted with irregular lumps of a light yellow substance which dissolves rapidly in

ammonia. Its ascospores are much larger than those of *D. melaxanthus* and, though remaining long nonseptate in the ascus, develop one or occasionally 3 cross septa when shed.

Unguicularia digitalincola* (Rehm) von Höhnel in Sitz. Ak. Wiss. Wien, Mathem.-naturw. Kl. Abt. 1, **127, 609 (1918)

3700 m., inside dead hollow stems of *Espeletia spicata*, second Corrie of Sierra de Sto. Domingo, south of Mucubaji, Edo. Mérida, 25.7.1958, *Dennis & Buza* 2390; 2451.

Several light-coloured species of *Unguicularia* have been described on dead herbaceous stems and of these the Venezuelan fungus agrees best with the description of *U. digitalincola*. There is nothing to indicate that the Unguicullariae are narrowly host-limited and it seems best to refer *Dennis* 2390 & 2451 to the above species, at least until the genus has been critically revised. The descriptions suggest that *U. alpigena* (Rehm) von Höhnel is rather doubtfully distinguished from *U. digitalincola* by its pinkish hue. According to von Höhnel it has thicker hairs, 8μ thick at the base, but Rehm's description of *Dasyscypha hyalotricha*, which von Höhnel regarded as a synonym of *U. alpigena*, indicated hairs 60 × 3μ. A brief description of the Venezuelan collection follows. It will be seen to differ from most described species of the genus in the association of relatively large asci with unusually slender small hairs.

Apothecia scattered, superficial, sessile, globose then urniform, up to 0·4 mm. diameter, white, drying isabelline with a white margin; hairs very abundant, closely adpressed, terminal solid portion cylindrical, flexuous, obtuse or pointed, glassy and brittle, 20–40 × 3 (–4μ), stained red-brown with Melzer's reagent; asci 50–70 × 6–8μ, pore strongly blued by iodine, ascospores elliptic-cylindric, 9–13 × 2·5–3μ, paraphyses filiform 1μ thick. Fig. 13, p. 439.

ORBILIACEAE

Orbilia tenuissima* Speg. in An. Soc. Cient. Argentina **26, 57 (1888)

3700 m., on dead leaf of *Espeletia spicata*, second corrie of the Sierra de Santo Domingo, south of Mucubaji, Edo. Mérida, 25.7.1958, *Dennis & Buza* 2447.

**Orbilia xanthostigma* (Fr.) Fr., Summa Veg. Scand. Sect. Post. 357 (1849)

c. 300 m., on decorticated wood, coffee plantation, Chichiriviche, Dto. Federal, 6.7.1958, *Dennis & Aristeguieta* 1220.

Dennis 1181, from the same locality as *D. & A.* 1220, has the microscopic characters of *O. curvatispora* Boud. var. *minor* Dennis but with much larger vinaceous apothecia. Its identity remains uncertain pending critical revision of the genus.

DERMATEACEAE

**Catinella olivacea* (Batsch ex Fr.) Boud., Hist. Classif. Discom. d'Europe 150 (1907)

c. 300 m., on decorticated wood in coffee plantation, Chichiriviche, Dto. Federal, 6.7.1958, *Dennis* 1220B. Durand (1922), who revised the genus, recorded *C. olivacea* from Cuba but not from South America. I have elsewhere reported its occurrence in the provinces of Salta and Tucuman, Argentina. *C. elastica* (Pat.) Durand, from Mapire, Venezuela, differs in its much larger ascospores, 13–15 × 6–7μ.

***Mollisia andina** *Dennis*, sp. nov.

Apothecia sparsa, superficialia, urceolata, sessilia, atra, 0·3–0·4 mm. diametra, disco griseo, concavo. Ascis cylindraceo-clavatis, octosporis, 50 × 5μ, obturaculo minutissimo jodo coerulescente. Ascosporae fusoideo-elongatae, rectae vel leniter curvulae, 10–12 × 2μ. Paraphyses filiformes. Fig. 14.

Ad culmos graminae siccos, 3200 m., Hacienda La Corcovada, Sierra de Santo Domingo, Edo. Mérida, 29.7.1958, *Dennis & Buza* 2397.

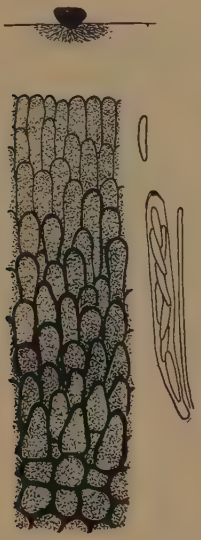


FIG. 14. *Mollisia andina*. Apothecium × 15, marginal area in surface view, spore, ascus and paraphysis × 660,

Each apothecium is seated on a sparse circular web of dark brown, radiating, septate hyphae 3μ diameter on the surface of the dead leaf sheath. These thin hyphal mats are about three times the diameter of the apothecia and do not unite to form a common subiculum. The apothecia are peculiar in being black throughout, with no trace of the usual paler margin. The excipular cells are thickwalled, very dark brown, 7–8μ diameter and globose towards the base of the receptacle, pyriform on the surface of its sides and pass into parallel brown hyphae 3–4μ wide at the margin.

Mollisia caesia (Fuck.) Sacc. var. **andina** *Dennis*, var. nov. a typo differt ascosporis septatis, 14–18 × 2–2·5μ.

Supra corticem ramorum dejectorum, 3700 m., Sierra de Santo Domingo, Edo. Mérida, 25.7.1958, *Dennis* 2387 (typus).

This agrees closely in structure with Sydow's Mycotheca Marchica 672, cited by Rehm as *M. caesia*, which yields only nonseptate ascospores 9–11 × 1·5–2μ. Fuckel recorded longer ascospores, 16 × 3μ, but found them to be nonseptate though biguttulate. A brief description of the Venezuelan fungus follows:

Apothecia scattered, superficial, each with brown, septate, anchoring hyphae 4μ wide but without a common subiculum, saucer-shaped, sessile on a broad base; disc flat, 1–1·5 mm. diam., bluish-gray, drying whitish; recept-

acle sooty brown with a prominent whitish margin. Basal excipulum about 40μ thick, composed of thinwalled, dark brown, isodiametric cells, 10–15μ across; lateral excipulum with 1–2 layers of rectangular to pyriform, thinwalled, brown cells, becoming more elongated and almost hyaline towards the margin; flesh thin, subhyaline, composed of slender hyphae, 2–3μ wide. Asci long stalked, 75–85 × 6μ, pore blued by Melzer's reagent; ascospores fusiform, straight or slightly curved, 14–18 × 2–2·5μ, 1-septate; paraphyses cylindrical, hyaline, 2μ thick. Fig. 15.

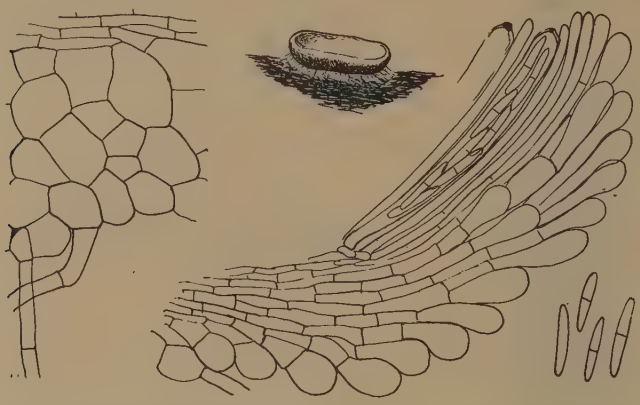


Fig. 15. *Mollisia caesia* var. *andina*. Apothecium × 12, marginal zone, ascospores and portion of basal excipulum × 660

Mollisia renispora *Dennis*, sp. nov.

Ascomatibus dispersis, superficialibus, plane patellaribus, ad 1·5 mm. diam., griseis, contextu paranchymatico fusco, margine albido; ascis cylindraceo-clavatis, 70 × 7μ, sursum obtuse conicis et incrassatis, obturaculo jodo coeruleo-tincto; ascosporis monostichis vel distichis, ovoideis vel reniformibus, 10–12 × 3·5–5μ, hyalinis, biguttulatis; paraphysibus cylindraceis, hyalinis, obtusis, 2–2·5μ crassis. Fig. 16.

A ligna putrescentia, Sierra Nevada, Edo. Mérida, 19.7.1958, *Dennis* 1682, typus; c. 2600 m., La Silla, Dto. Federal, 4.7.1958, *Dennis* 1367.

The apothecia have a small basal peg penetrating the substrate and surrounded by a thin layer of anchoring hyphae which barely extends beyond the area covered by the fructification. They differ from those of *M. ellipsospora* Rodway in their paler colour and whitish margin as well as in their larger ascospores. The substrate of the type collection was a wet decorticated log lying in a small stream bed in dense forest.

Mollisia subglobosa Rodway in Pap. & Proc. Roy. Soc. Tasmania **1924**, 102 (1925)

3460 m., on dead wood, Laguna de Canoa, Sierra de Santo Domingo, Edo. Mérida, 30.7.1958, *Dennis & Buza* 2376. Fig. 17, p. 444.

In this collection the ascospores are slightly smaller than those of the type, 5–6 × 3μ instead of 6–8 × 3–3·5μ but they give the same strong pseudoamyloid reaction and appear equally punctate. In all other features

the two collections agree. This is certainly not a good *Mollisia* but I know of no more appropriate genus for it at present. The presence of this strange fungus both in Tasmania and in the Andes confirms the relationship between the Australian and South American floras already indicated, for example, by the distribution of *Dasyscyphus lachnodermus*, *Rutstroemia macrospora*, *Cyttaria* spp. and *Sorokina* spp.

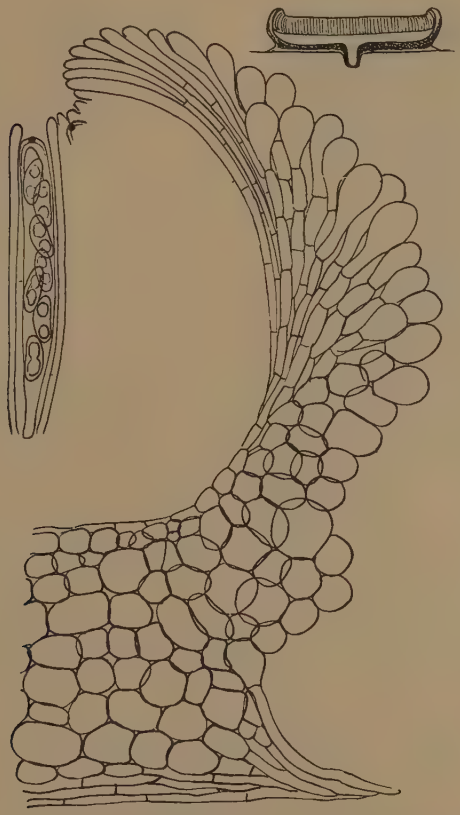


FIG. 16. *Mollisia renispora*. Diagrammatic section × 15, section of margin, ascus and paraphyses × 660

Tapesia bromeliacearum *Dennis* sp. nov.

Ascomatibus epiphyllis, gregariis, primitus globoso-clausis, dein patellaribus, in mycelio brunneo sessilibus; receptaculo villoso, nigro-brunneo, albo-marginatis; disco griseo, ad 1 mm. diametro, siccis flavidis; excipulo basi fuscidulo et e cellulis parenchymatice, ceteris e cellulis elongatis contextis, pilis cylindraceis vel moniliformibus, obtusis, septatis, brunneis, ad 80 × 3–4μ. Ascis clavatis, apice rotundatis, sessilibus, 60–65 × 8–9μ, octosporis, jodo immutatis; ascosporis distichis, cylindraceo-oblongis, utrinque rotund-

atis, hyalinis, continuis, 9–12 × 2·5–3μ; paraphysibus cylindraceis, obtusis, hyalinis, 2·5μ crassis. Fig. 18.

Hab. in foliis putridis *Bromeliacearum*, 2000 m., El Avila, Dto. Federal, 17.6.1958, *Dennis* 1222 (typus).

Fig. 17. *Mollisia subglobosa*. Section of margin and spore × 660

This species is probably akin to those described by Rehm from other kinds of dead leaves in South America and later referred by Saccardo and Sydow to their genus *Linhartia*, defined as similar to *Trichobelonium* but with only 1-septate ascospores. Several of these species were noted an having an ascus pore with a negative reaction to iodine. This is likely to be a better generic character than the mere presence or absence of a septum in the spores. I have seen no septum in the ascospores of my 1222 and, as its hairs are little longer than those in some of the fungi currently passing under the collective name '*Tapesia rosae* (Pers. ex Fr.) Fuck.' it appears best to refer the former also to *Tapesia*. *Mollisia bromeliicola* P. Henn., from Brasil, was described as having ascospores only 4–6 × 1μ. *Pirottaea bromeliacearum* Rick, also from Brasil, is said to have erumpent apothecia with ascospores 10–12 × 5μ.

Grovesia *Dennis*, gen. nov.

Apothecia erumpentia-superficialia, atra, sessiles, disco coccineo. Asci elongati, octospori, paraphysati, sporidia fusoidea, hyalina.

The genus is very closely related to *Cerion* Massee, from which it is separated by the fusiform, not filiform, ascospores. From *Atropellis* Zeller & Gooding it differs in ascospore characters and in not being associated with conifers. In structure *Grovesia* recalls *Heterosphaeria* Grev. The name is proposed in honour of the distinguished Canadian mycologist Dr. J. W. Groves whose wide knowledge of the *Dermateaceae* and *Sclerotiniaceae* of North America is always generously made available to those less familiar with these difficult fungi.

Grovesia pulchella *Dennis*, sp. nov.

Apothecia erumpenti-superficialia, atra, coriacea, disco coccineo, 5 mm. diam. Asci octospori, 260 × 10μ, ascosporae hyalinae, fusoideae, 75–102 × 3–4μ. In ramis emortuis, Laguna negra, Sierra de Santo Domingo, Mérida, 1.8.1958, *Dennis* 2455 (typus).

Apothecia scattered, superficial, disc coral-red, up to 5 mm. diameter, flat, margin thin, prominent when dried, undulating, black; receptacle saucer-shaped, sessile on a broad base, surface smooth and black, much wrinkled when dry; hypothecium white, basal tissue grey. Flesh in the centre of the apothecium composed of small, thin-walled, angular cells, 4–7μ diameter, with granular black matter deposited between their walls;

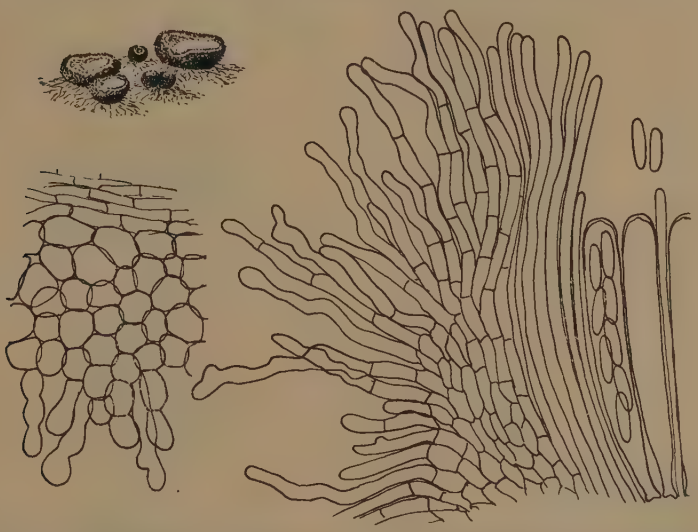


Fig. 18. *Tapesia bromeliacearum.* Apothecia × 10, section of margin, spores and basal excipulum × 660

hypothecium formed of slender, interwoven, hyaline hyphae 1–1·5μ wide; excipulum composed of prismatic cells, about 3μ wide, arranged in rows almost at right angles to the surface, walls hyaline except in the outermost layers, where they are so blackened as to be opaque even in sections cut at 15μ thickness. This blackened tissue forms the black rind of the receptacle. Asci narrowly cylindrical, about 260 × 10μ, 8-spored, the pore not blued by Melzer's reagent; ascospores narrowly fusiform, hyaline, biseriate, 75–102 × 3–4μ; paraphyses very slender, often branched, enlarged up to 3μ diameter towards their obtuse tips. Fig. 10, p. 446.

GEOGLOSSACEAE

Geoglossum cohaerens* Durand in Ann. Mycol. **6, 430 (1908)
3849 m., Bog at head of Laguna de los Patos, Sierra de Santo Domingo, Edo. Mérida, 28.7.1958, *Dennis & Buza* 1816, ascospores olive-brown, 3-septate, 48–62 × 3–4μ, paraphyses very dark brown.

PHACIDIACEAE

Naemacyclus foliicola (*Berk. & Curt.*) *Dennis*, comb. nov.
Stictis foliicola Berk. & Curt. in Journ. Linn. Soc. Bot. **10**, 371 (1868)
c. 1300 m., on dead leaf of *Clusia*, Los Guayabitos, Edo. Miranda, 8.6.1958, *Dennis & Foldats* 1340A.

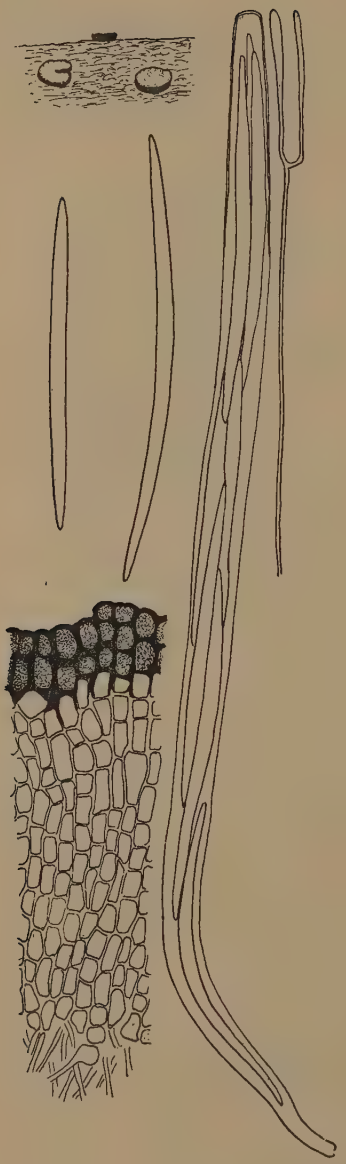


FIG. 19. *Grovesia pulchella*. Apothecia natural size, ascus, paraphysis, spores and portion of excipulum in section × 660

FIG. 20. *Naemacyclus foliicola*. Apothecia × 10, asci and paraphyses × 660

Asci 80–155 × 8–9μ, 8-spored, pore not blued by iodine, ascospores fasciculate, slightly clavate, pointed below, becoming septate, 50–85 × 2μ; paraphyses simple, clavate, apex up to 4μ wide, with thick, white, finely encrusted wall. Fig. 20.

HYPODERMATACEAE

Coccomyces pluridens (Berk. & Curt.) Sacc., Syll. fung. **8**, 747 (1889)
Phacidium pluridens Berk. & Curt. in Journ. Linn. Soc. Bot. **10**, 371 (1868)
c. 2000 m., on dead leaves of *Clusia*, in cloud forest near Hotel Humboldt, El Avila, Dto. Federal, 4.7.1958, *Dennis* 1281.

Recorded by Sydow, as *C. clusiae* (Lév.) Sacc., on *Clusia rosea* in the state of Aragua.

Lophodermium platyplacum (Berk. & Curt.) Sacc., Syll. fung. **2**, 792 (1883)
Hysterium platyplacum Berk. & Curt. in Journ. Linn. Soc. Bot. **10**, 372 (1868)
c. 1300 m., on dead leaves of *Clusia*, Los Guayabitos, Edo. Miranda, 8.6.1958, *Dennis & Foldats* 1340; c. 2000 m., El Avila, Dto. Federal, 4.7.1958, *Dennis* 1281A.

Sydow has given a full description of this species from material collected on *Clusia rosea* in the state of Aragua.

CORYNELIACEAE

Corynelia oreophila* (Speg.) Stärback in Arkiv för Bot. **5(7), 20 (1905)
Alboffia oreophila Speg. in An. Mus. Nac. Buenos Aires **6**, 295 (1898)
1900 m., on *Podocarpus pittieri*, El Avila, Dto. Federal, 17.8.1958, *Dennis* 1811; 23.8.1958, *Dennis* 2005.

TRYBLIDIACEAE

Tryblidiella rufula (Sprengel ex Fr.), Sacc., Syll. fung. **2**, 757 (1883)
900 m., on dead branches, Botanic Garden, Caracas, 30.6.1958, *Dennis* 1274; 1900 m., on dead branches in cloud-forest, west ridge of El Avila, Dto. Federal, 23.8.1958, *Dennis* 2359.

Chardon (1939) recorded *T. rufula* from Barceolona, Edo. Anzoategui.

Tryblidiella rufula var. *microspora* (Ell. & Ev.) Rehm in Ann. Mycol. **2**, 524 (1904)
950 m., on dead branches, Botanic Garden, Caracas, 12.7.1958, *Dennis* 1664.

This collection consists of apparently mature apothecia with fully coloured ascospores 18–24 × 6–8μ. It apparently corresponds to *T. ellisii* Rehm and *T. guaranitica* (Speg.) Rehm but according to Theissen, in Ann. mycol. 6, 534, 1908, *T. guaranitica* is a state of *T. rufula*. Theissen's synonyms are not always reliable but in view of the close agreement of my 1664 with typical *T. rufula* in everything but ascospore size it seems best not to regard it as referable to a distinct species.

XYLARIACEAE

Xylosphaera coccophora (Mont.) Dennis in Kew Bull. **13**, 103 (1958)
c. 800 m., on sticks in forest, Guatopo, Edo. Miranda, 22.6.1958, *Dennis* 1416.

Ascospores 6–8 × 2·5–3μ, rather small for the species but the material is scarcely mature.

It was collected by Gaillard (as *X. compressa* Pat. & Gaill.) at Atures.

Xylosphaera comosa* (Mont.) Dennis in Kew Bull. **13, 103 (1958)
c. 800 m., on logs, Guatopo, Edo. Miranda, 22.6.1958, *Dennis* 1215. Conidial state only.

Xylosphaera cubensis (Mont.) Dennis in Kew Bull. **13**, 103 (1958)
c. 400 m., in coffee plantation, Chichiriviche, Dto. Federal, 6.7.1958, *Dennis* 1307; c. 1900 m., on dead branch in cloud forest, El Avila, Dto. Federal, 17.6.1958, *Dennis* 1443, ascospores 8–10 × 4–4·5μ.
Collected by Gaillard at Cerro Uniana.

Xylosphaera curta* (Fr.) Dennis in Kew Bull. **13, 103 (1958)
1200 m., on logs in garden, Cortada del Guayabo, Edo. Miranda, 9.7.1958, *Dennis* 1204.
Ascospores 8–10 × 4μ.

***Xylosphaera fockei** (*Miquel*) *Dennis*, comb. nov.
Sphaeria fockei Miquel in Tijdschr. Wis. en Nat. Wet. **5**, 198 (1852)
Xylaria dealbata Berk. & Curt. in Journ. Acad. Nat. Sci. Philadelphia, N.S. **2**, 284 (1853)
c. 800 m., Guatopo, Edo. Miranda, 27.6.1958, *Dennis* 1283, ascospores 26–30 × 6·5–8μ.
Inspection of the excellent type material of *S. fockei* from Surinam, kindly sent on loan from the herbarium at Utrecht, has established the above synonymy and rendered it necessary to replace the well-known and descriptive epithet '*dealbata*' for this distinctive species. It is noteworthy that the types of *X. dealbata* and of *S. fockei* both came from Surinam.

Xylosphaera grammica (Mont.) Dennis in Kew Bull. **13**, 103 (1954)
1200 m., on logs in garden, Cortada del Guayabo, Edo. Miranda, 9.6.1958, *Dennis* 1263, immature; 950 m., on stump, Botanic Garden, Caracas, 18.8.1958, *Dennis* 2415, further advanced but still immature. The ascospores evidently ripen at the end of the wet season.
Chardon & Toro collected the species in September and November in Yaracuy and Tachira respectively.

***Xylosphaera heloïdea** (*Penz. & Sacc.*) *Dennis*, comb. nov.
Xylaria heloïdea Penz. & Sacc. in Malpighia **11**, 498 (1897)
900 m., on dead leaves and twigs under shrubs, Botanic Garden, Caracas, 19.6.1958, *Dennis* 1262, immature stromata without ascospores; same locality 14.7.1958, *Dennis* 1659, maturing, with ascospores 15–19 × 6–8μ.
This species was not recorded from tropical America by Dennis (1957), the only material then seen under the name, from Brasil, having been immature and of doubtful identity. The Venezuelan collections are an excellent match with the type, from Java, as will be seen from Fig. 21.

***Xylosphaera massula** (*Ces.*) *Dennis*, comb. nov.
Xylaria massula Ces., Mycetum itin. Borneensi 15 (1879)
c. 800 m., gregarious on decorticated wood, Guatopo, Edo. Miranda, 27.6.1958, *Dennis* 1396, stromata like a very minute *X. curta*, ascospores 8–10 × 3·5–4μ.

Xylosphaera obovata (*Berk.*) *Dennis*, comb. nov.
Sphaeria obovata Berk. in Ann. Mag. Nat. Hist. **3**, 397 (1839)
c. 2600 m., on stump in dense forest of Sierra Nevada, La Mucuy, Edo. Mérida, 6.8.1958, *Dennis* 2405, ascospores 22–27 × 7μ.

The collection included numerous carpophores, remarkably consistent in shape, suggesting that this may be a good species within the *X. polymorpha* complex. Berkeley & Curtis listed it from Venezuela in their 'Fungi Cubenses'.

FIG. 21. *Xylosphaera heloïdea*. Stromata natural size and × 10, ascospores × 660

Xylosphaera polymorpha (Pers. ex Mérat) Dumortier, Com. Bot. 91 (1822)
800 m., Guatopo, Edo. Miranda, 27.6.1958, *Dennis* 1366, ascospores 21–23 × 6μ.

These are the common tropical state sometimes distinguished as *Xylaria schweinitzii* Berk. & Curt., under which name the species has been recorded by Miller from Yaracuy and Tachira. Dennis (1957) had it from Aragua and Cardona collected it at Salto de Guaiguinima, Alto Paragua, Guayana, 10.10.1943.

Xylosphaera telfairii (Berk.) Dennis in Kew Bull. **13**, 106 (1958)
800 m., on logs in dense forest, Guatopo, Edo. Miranda, 22.6.1958, *Dennis* 1214, the grayish state sometimes distinguished as *Xylaria wrightii* Berk. & Curt., ascospores 16–19 × 6μ; same locality, 27.6.1958, *Dennis* 1283A, the small state sometimes distinguished as *Xylaria enterogena* (Mont.) Fr., with ascospores 17–18 × 7μ. The following collection at Instituto Botanico, Caracas, is typical *X. telfairii*: Vegas del Rio Lora, Zulia, 12.12.1932, *Pittier* 10968.

Chardon (1939) recorded the species, as *Xylaria tabacina* (Kickx) Berk., from Rancho Grande, Aragua.

In addition to the species listed above Miller has recorded from Venezuela *X. anisopleura* (Mont.) Dennis, *X. guyanensis* (Mont.) Dennis, *X. hypoxylon* Dumortier, *X. ianthino-velutina* (Mont.) Dennis, *X. inaequalis* (Berk. & Curt.) Dennis, *X. mellissii* (Berk.) Dennis (as *Xylaria arbuscula* Sacc.), *X. luxurians* (Rehm) Dennis, *X. multiplex* (Kze.) Dennis and *X. scruposa* (Fr.) Dennis. Patouillard recorded *X. papyrifera* (Link) Dennis (as *Xylaria allantodea* (Berk.) Fr.), Chardon (1939) *X. aristata* (Mont.) Dennis and Dennis (1957) *X. aenea* (Mont.) Dennis.

Penzigia arntzenii* Theissen in Ann. mycol. **6, 346 (1908)

Stromata sessile, pulvinate, 1–1·5 mm. diameter, flattened above, with a central sterile pointed tip, crust smooth, black, flesh white, solid, perithecia 1–9, completely immersed, ostiolar papilla minute, seated in a shallow depression in the upper surface of the stroma. Asci about 170 × 20μ, 8-spored, with massive apical ring blued by Melzer's reagent; ascospores uniseriate, elliptical, brown, 25–31 × 15–18μ; paraphyses hyaline, filiform. Fig. 22, p. 450.

1500 m., on dead herbaceous stem, Rio Chama valley, Mérida 20.7.1958, *Dennis* 1827.

There is no authentic material of *P. arntzenii* at Kew and I owe the determination to the kindness of Prof. J. H. Miller, who has compared *Dennis* 1827 with part of the type collection sent him by Rick.

The following species of *Hypoxylon* have most kindly been determined by Prof. J. H. Miller:

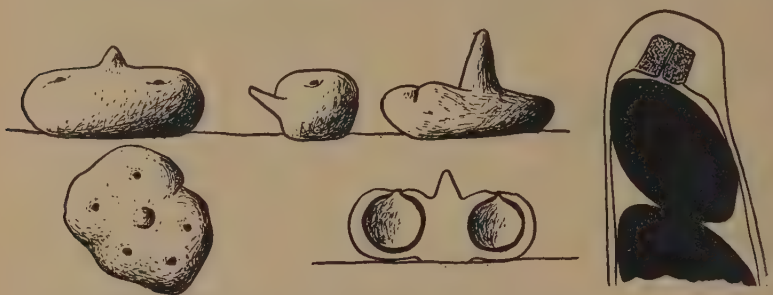


FIG. 22. *Penzigia arntzenii*. Stromata and section × 12, ascus tip × 660

Hypoxylon dieckmannii* Theissen in Ann. mycol. **6, 346 (1908)
800 m., Guatopo, Edo. Miranda, 25.7.1958, *Dennis* 1300, various stages of development on the same dead branch. This is a small-spored *rubiginosa* with spores 8–9 × 3–3·5μ (Miller).

***Hypoxylon divergens** (*Theissen*) *Miller*, comb. nov.
Nummularia divergens Theissen in Ann. mycol. **6**, 349 (1908)
2000 m., cloud forest, El Avila, Dto. Federal, on logs, 17.6.1958, *Dennis* 1225.
Spores 15–18 × 6–8μ, apiculate at one end but old and the apiculus worn off (Miller).

Hypoxylon investiens* (*Schw.*) Berk. forma **bakeri (*Ellis*) *Miller*, comb. nov.
Rosellinia bakeri Ellis in Torreya **5**, 87 (1909)
900 m., Botanic Garden, Caracas, Dto. Federal, 12.7.1958, *Dennis* 1655.
Spores 8–10 × 3–4μ, in this species the perithecia can be entirely immersed in a continuous stroma or almost free (Miller).

Hypoxylon melanaspis (Mont.) Mont. in Ann. Sci. Nat., Bot. Sér. 4, **3**, 121 (1855)
2300 m., La Mucuy, Forests of the Sierra Nevada, Edo. Mérida, 6.8.1958, *Dennis* 1831A. Material immature.

The species was recorded by Patouillard (1888) from San Fernando de Atabapo, on the upper Orinoco, in intimate association with *Camillea leprieurii* (Mont.) Mont.

Hypoxylon nummularium* (Bull. ex St. Amans) Fr. var. **merrillii (*Bres.*) *Miller*, comb. nov.
Nummularia merrillii Bres. in Hedwigia **56**, 307 (1915)
800 m., Guatopo, Edo. Miranda, 26.6.1958, *Dennis* 1265. Probably this but immature.

Hypoxylon rubiginosum (Pers. ex Fr.) Fr. Summa Veg. Scand., Sect. Post. 384 (1849)
2600 m., on dead wood in elfin woodland, La Silla, 4.7.1958, *Dennis* 1408;

2300 m., La Mucuy, Sierra Nevada, Edo. Mérida, 7.8.1958, *Dennis* 1831, old blackened state, spores 10–12 × 5–6μ (Miller).

Already recorded by Miller from the states of Miranda, Mérida and Yaracuy and by Patouillard from Pallisades d'Atures.

Hypoxylon stygium (Lév.) Sacc., Syll. fung. **1**, 379 (1882)
800 m., Guatopo, Edo. Miranda, 26.6.1958, *Dennis* 1288; 900 m., Botanic Garden, Caracas, 20.6.1958, *Dennis* 1473.

Previously recorded by Miller from the states of Carabobo, Tachira and Yaracuy.

Hypoxylon truncatum (Schw.) Miller in Trans. Brit. Mycol. Soc. **17**, 130 (1932)
800 m., Guatopo, Edo. Miranda, 26.6.1958, *Dennis* 1459, spores somewhat smaller than usual (Miller).

Chardon (1939) recorded this species from Aragua.

Kretzschmaria clavus (Fr.) Sacc., Syll. fung. **2**, xxix (1883)
c. 800 m., on log in open ground, Guatopo, Edo. Miranda, 26.6.1958, *Dennis* 1416.

Recorded from Aragua by Chardon (1939).

**Poronia punctata* (Fr.) Fr., Summa Veg. Scand., Sect. Post. 382 (1849)
3550 m., immature stromata on horse-dung, Laguna Mucubaji, Sierra de Santo Domingo, Edo. Mérida, 22.7.1958, *Dennis* 2424.

Chardon and Toro collected the common tropical *P. oedipus* (Mont.) Mont. at much lower altitudes in the states of Aragua and Trujillo. The Venezuelan collection of *P. punctata* is of interest in view of the earlier record of the species from a similar station in the Argentine Andes.

Thamnomyces chordalis* Fr. in Linnaea **5, 534 (1830)
800 m., very abundant all the way up a dead but still erect trunk in a clearing, Guatopo, Edo. Miranda, 22.6.1958, *Dennis & Aristeguieta* 1391; in clusters on bark of a fallen trunk, same locality, 26.6.1958, *Dennis* 1390.

Comparison of these two collections, *Dennis & Aristeguieta* 1391 overmature, *Dennis* 1390 immature, satisfies me that *T. chordalis* Fr. and *T. rostratus* Mont. were based on immature and mature states of a single species. The much branched stromata of *T. dendroïdea* Cooke & Massee have also been collected in Venezuela, by Grisol in the state of Guarico (Dennis, 1957).

Phylacia globosa Lév. Ann. Sci. Nat., Bot. Sér. 3, **3**, 61 (1845)
900 m., dead wood in a garden, Caracas, 25.6.1958, *Dennis* 1308. This excellent material still contains asci, 8-spored, elliptical, 30–45 × 10–13μ.

The species may not be distinct from the next listed but the name applies to stromata usually somewhat larger than those of the latter, without the characteristic pointed tip and with a less concentrically wrinkled surface.

Phylacia sagraeana (Mont.) Mont., Syll. Gen. Spec. Crypt. 259 (1856)
900 m., very abundant, erumpent from the bark of logs, Botanic Garden, Caracas, 19.6.1958, *Dennis* 1291.

Recorded by Miller from Distrito Federal and from the states of Carabobo and Yaracuy and by Dennis from Aragua.

Neurospora phoenix (*Kunze*) *Dennis*, comb. nov.
Sphaeria phoenix Kunze apud Fr. in Linnaea **5**, 541 (1830)

800 m., on charred bases of a tall grass and on charred bark of an adjacent log, Guatopo, Edo. Miranda, 26.6.1958, *Dennis* 1415.

In Kew Bulletin **13**, 304 (1957) I commented on the affinity of this fungus with *Neurospora* but referred it to *Xylaria* because of its stalked stromata and some lingering uncertainty about the constant occurrence in it of striated ascospores. The above ample collection shows that perithecia may occur in isolation and in small sessile clusters as well as in the characteristic stromata and that the ascospores have a distinct reticulate-striate ornament, though this tends to become obscured at maturity as the spores become opaque. These ascospores and the close association with charred plant tissue are both characteristic of *Neurospora* and it seems that the species will find a more natural place there than in *Xylosphaera*.

In the same perithecium one can find asci with 8 mature dark brown spores and others with 4 mature coloured spores and 4 hyaline ones. The majority of asci in most perithecia, however, contain 8 coloured spores.

Another species described with striate brown ascospores and perithecia in a light coloured stroma is *Xylocrea elegantissima* Rick, on burnt grass in Brasil, but that is said to have much larger ascospores, 25 × 12μ.

Sordaria perplexans* Cain in Univ. Toronto Studies, Biolog. Ser. **38, 50 (1934)

3550 m., on cow-dung, Laguna Mucubaji, Sierra de Santo Domingo, Edo. Mérida, 2.8.1958, *Dennis* 2412, ascospores uniseriate, 35–48 × 21–28μ, primary appendage 20 × 7μ, secondary appendages slender, simple.

Chardon recorded from lower altitudes (1720–1850 m.) in the states of Trujillo and Mérida the rather similar *S. fimiseda* Ces. & de Not., which differs in its larger biseriate ascospores, 53–56 × 27–30μ.

Bombardia arachnoïdea* (Niessl) Cain in Univ. Toronto Studies, Biolog. Ser. **38, 73 (1934)

3550 m., on cow-dung, Laguna Mucubaji, Sierra de Santo Domingo, Edo. Mérida, 2.8.1958, *Dennis* 2409.

Chardon recorded the closely allied *B. coprophila* (Fr.) Kirsch. (as *Pleurage albicans* (A. & S.) Griff.), from lower altitudes, 1050–1850 m., in Trujillo, Mérida and Tachira. I have referred my 2409 to *B. arachnoïdea* because of its brown, septate, undulating hairs and the complete absence of a white tomentum. The perithecia were noted as 'black' in the field.

Rosellinia ? *australis* Speg. in An. Mus. Mac. Buenos Aires **19**, 337 (1909)

c. 400 m., on rotting log in coffee plantation, Chichiriviche, Dto. Federal, *Dennis & Aristeguieta* 1260.

This determination is tentative as no authentic material is available for comparison. The general aspect of the collection is that of *R. aquila* (Fr.) de Not. but the perithecia are a little smaller than is usual in european material of that species and most have a distinctly flattened disc around the small ostiolar papilla. The ascospores measure 18–21 × 5·5—7μ but the material is too old to show whether small hyaline appendages were ever present.

Rosellinia subiculata* (Schw.) Sacc., Syll. fung. **1, 255 (1882)

c. 400 m., on decorticated wood, Chichiriviche, Dto. Federal, 6.7.1958, *Dennis & Aristeguieta* 1374; 2000 m., Cloud-forest, El Avila, Dto. Federal, 13.6.1958, *Dennis* 1319, ascospores 10–11 × 4·5–5·5μ.

Berkeley & Curtis, in their 'Fungi Cubenses', recorded *Sphaeria sepulta* Berk. & Curt. from Venezuela. This species has been referred to *Rosellinia* and the Venezuelan material, presumably from Fendler, is a *Rosellinia* with dense purplish-brown subiculum and ascospores which measure 54 × 9–10μ while still hyaline and immature. The typus, from Cuba however, has long-beaked perithecia with hyaline multiguttulate ascospores about 55 × 4μ so that the record of *S. sepulta* from Venezuela should be deleted.

**Rosellinia* (*Coniochaeta*) *ligniaria* (Grev.) Nits. apud Fuck. in Jahrb. Nass. Ver. f. Naturk. 23/24, 150 (1870)
3700 m., on decorticated wood, Sierra de Santo Domingo, south of Mucubaji, Edo. Mérida, 25.7.1958, *Dennis & Buza* 2457.

SPORORMIACEAE

Delitschia auerswaldii Fuck. in Jahrb. Nass. Ver. f. Naturk. 23/4, 241 (1870)
3550 m., on cow-dung, Laguna Mucubaji, Sierra de Santo Domingo, Edo. Merida, 2.8.1958, *Dennis* 2408.

Chardon recorded *Sporormia intermedia* Auersw. from sheep-dung at the nearby Laguna negra.

CLATHRACEAE

Clathrus chrysomycelinus* Möller apud Schimper, Bot. Mitt. Tropen **6, 146 (1893)
Clathrella chrysomycelina (Möller) Ed. Fischer in Denkschr. Schweiz. Naturf. Ges. **36** (2), 37 (1900)
c. 800 m., amongst humus and dead leaves in forest, Guatopo, Edo. Miranda, 25.6.1958, *Dennis* 1100.

Volva about 2·5 cm. diameter, smooth, pale ochraceous, attached to a deep golden yellow cord-like mycelium. Receptacle obovate, c. 8 cm. high and 5 cm. wide, meshes of the lattice elongated below, square to hexagonal and 1–1·5 cm. across in the upper half of the receptacle; branches 2–2·5 mm. diameter and light orange in the upper part, broader and white below, 2–4 chambered in cross section, inner surface transversely corrugated. Gleba dark olive, deposited in isolated drops at or near the nodes of the lattice. Spores very pale olive, elliptic-cylindric, 3·5–4 × 1·5–2·25μ. The specimen was fully expanded when found and the yellow colour of the upper part of the receptacle may therefore be due to age. Fig. 23, p. 454.

Clathrus preussii* (P. Henn.) P. Henn. in Engl., Bot. Jahrb. **23, 558 (1897)
Clathrus camerunensis P. Henn. var. *preussii* P. Henn. in Engl., Bot. Jahrb. **22**, 108 (1895)
Clathrella preussii (P. Henn.) Ed. Fischer, *op. cit.* 36 (1900)
c. 500 m., on ground in coffee plantation, Chichiriviche, Dto. Federal, 6.7.1958, *Dennis* 1392; c. 1000 m., Mariposa, Edo. Miranda, 20.6.1958, *Dennis* 1079.

Unopened peridium 3·5 cm. diameter, sphaeroidal, somewhat flattened above, lilac, surface divided by furrows into polygonal areas which correspond to the chambers in the gelatinous zone of the peridial wall. Receptacle c. 5·5 cm. high and 4·5 cm. wide, white throughout, meshes rounded or polygonal, 1–1·5 cm. across, not noticeably elongated below; branches with trapezoidal section, outer surface flat, 2·5–5 mm. wide, finely reticulately wrinkled, sides corrugated, inner surface perforated, showing from 4 to 11

cells in cross section. Mycelium white, cord-like. Gleba dark olive, not confined to drops at the nodes but distributed in large patches over the inner surface of the branches. Spores elliptic-cylindric, 2·5–3·5 × 1–1·5μ. Smell rather sweet and fruity. Fig. 24, p. 455.

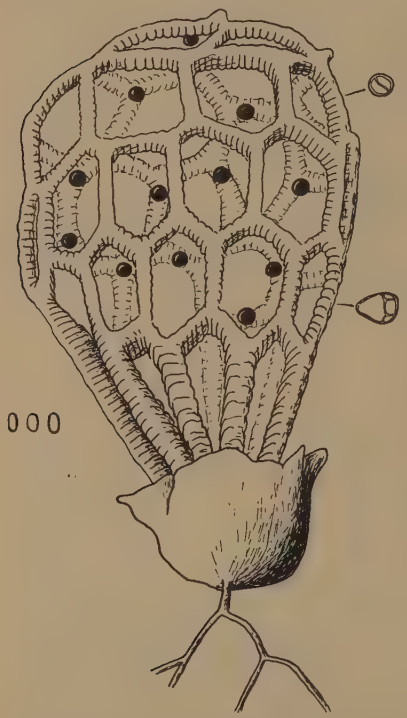


FIG. 23. *Clathrus chrysomycelinus*, natural size

The white *Clathrus* from Jamaica briefly described by Dennis (1953) was this species. These three collections are remarkably uniform in colouring, structure and stature and it seems unlikely that they should be referred to a state of *C. crispus* Turpin, which is usually stated to have a red receptacle. Rick (in Egatea **14**, 304) described *C. crispus* as 'fere alba salmonicolor in sicco'. He was actually referring to the very collection on which Lloyd had based his *Clathrus americanus*, as will be at once evident if the photographs published by these two authors are compared. Ulbrich, who redescribed *C. americanus* from Cuban material preserved in formalin, says nothing of the fresh colour. We shall not really know how many good species of *Clathrus* there are in the American tropics until collectors learn to make adequate colour notes and drawings from their fresh material.

PHALLACEAE

Dictyophora indusiata (Vent. ex Pers.) Desvaux in Journ. de Bot. **2**, 88 (1809) 1300 m., in a coffee plantation, La Mata, Guayabitos, Edo. Miranda, leg. *Dr. Vareschi*

Already recorded 'sur souches de bananier' from Camagnan, July 1923, by Patouillard, as *D. phalloïdea* Desv.

PODAXACEAE

Podaxis pistillaris* (L. ex Fr.) Fr., Syst. Myc. **3, 62 (1829)
Abundant, associated with fragments of decaying wood buried in sand a little above high-water mark, near Arrecifes, Dto. Federal, 5.7.1958, *Dennis & Aristeguieta* 1453.

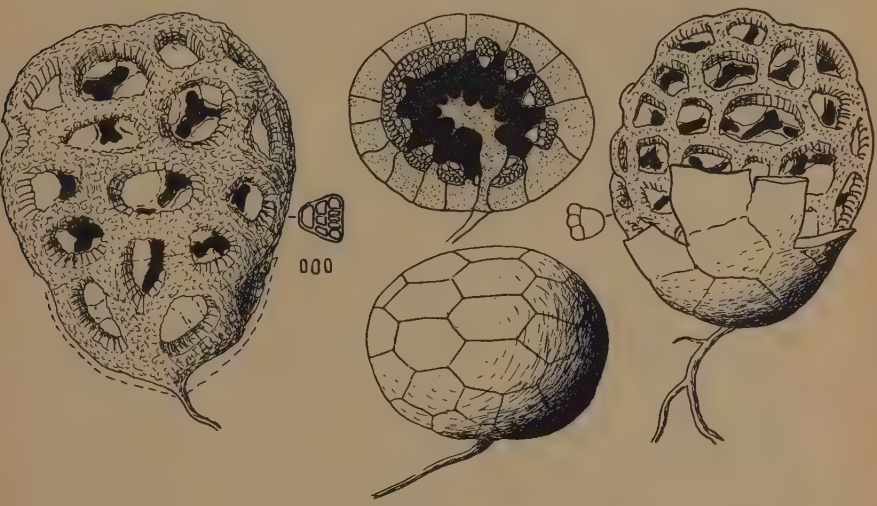


FIG. 24. *Clathrus preussii*, natural size

GEASTRACEAE

Geastrum mirabile Mont. in Ann. Sci. Nat., Sér. 4, **3**, 139 (1855)
c. 950 m., Rio Chacaito, Caracas, 18.11.1949, *Dennis* 99D.
Recorded by Patouillard from Guasdualito. The closely related *G. subiculosum* Cke. & Massee was reported from Carabobo by Coker.

Geastrum saccatum Fr., Syst. Myc. **3**, 16 (1829)
c. 400 m., on forest litter, Chichiriviche, Dto. Federal, 6.7.1958, *Dennis & Aristeguieta* 1205.
Recorded by Coker from low ground in the states of Aragua and Carabobo and by Dennis (1953) from Aragua.

Geastrum triplex Jungh. in Tijdschr. Nat. Ges. Phys. **7**, 287 (1840)
The following collection in the Instituto Botanico, Caracas, seems to be correctly so determined:
Quebrada de Chacaito, Caracas, 24.8.1923, leg. *H. Pittier* 11117. Coker recorded a collection from the state of Aragua.

Geastrum velutinum Morgan in Journ. Cincinnati Soc. Nat. Hist. **18**, 38 (1895)
c. 900 m., solitary on rotting leaves under trees, Botanic Garden, Caracas, 14.7.1958, *Dennis* 1205A.

Recorded by Coker from lower altitudes in the states of Aragua and Yaracuy.

LYCOPERDACEAE

Bovista tomentosa (Vitt.) de Toni in Saccardo, Syll. fung. **7**, 97 (1888)
3550 m., on bare soil, Mucubaji, Sierra de Santo Domingo, Edo. Mérida, 23.7.1958, *Dennis & Buza* 2513, 2514.

Recorded by Coker from Rincon de la Venta, Paramo de Timotes, Mérida.

Calvatia lilacina (Mont. & Berk.) P. Henn. in Hedwigia **43**, 205 (1904)
1350 m., El Hatillo, Edo. Miranda, 9.7.1958, *Dennis & Aristeguieta* 1448. Peridia up to 16 cm. across.

Recorded by Patouillard from Apure and by Coker from Guarico under the name *C. cyathiformis* (Bosc) Morgan.

Calvatia rubro-flava* (Cragin) Lloyd, Myc. Notes **1, 12 (1898)
2800 m., on soil beside forest path, La Mucuy, Sierra Nevada, Edo. Mérida, 7.8.1958, *Dennis & Buza* 2516.

Disciseda candida* (Schw.) Lloyd, Myc. Writings **1, 100 (1902)
3550 m., on bare soil, Laguna Mucubaji, Sierra de Santo Domingo, Edo. Mérida, 23.7.1958, *Dennis & Buza* 2515.

Lycoperdon ericetorum Pers. in Journ. de Bot. **2**, 17 (1809)
c. 3450 m., fringe of the paramo, Sierra Nevada opposite Mérida, 19.7.1958, *Dennis* 1688; 3550 m., Laguna Mucubaji, 22.7.1958, *Dennis* 1705; 3600 m., in pairs among dead grass on sodden ground, Mucubaji valley, Sierra de Santo Domingo, Edo. Mérida, 26.7.1958, *Dennis & Buza* 2517. Spores more distinctly verrucose than in British material of this species and more like those of *L. spadiceum* Pers. but agreeing better in macroscopic features with *L. ericetorum*.

Recorded by Coker from Laguna negra and Paramo de Timotes under the name *L. cepaeforme* Bull. and by Patouillard from near Quito, Ecuador under the name *L. furfuraceum* Schaef.

Lycoperdon fuligineum Berk. & Curt. in Journ. Linn. Soc. Bot. **10**, 345 (1868)
c. 800 m., on dead wood, Guatopo, Edo. Miranda, 26.6.1958, *Dennis* 1194A; c. 1800 m., on trees, El Junquito, Dto. Federal, 10.6.1958, *Dennis & Foldats* 1331.

Recorded by Patouillard from Raudal d'Atures and by Coker from Carabobo, both as *L. epixylon* Berk. & Curt., also by Dennis (1953) from Aragua.

**Lycoperdon perlatum* Pers., Syn. fung. 148 (1801)
c. 500 m., on soil in coffee plantation, Chichiriviche, Dto. Federal, 6.7.1958, *Dennis & Aristeguieta* 1312; 3200 m., on soil among rocks near Laguna de Coromoto, Sierra Nevada, Edo. Mérida, 7.8.1958, *Dennis & Buza* 1797, a form approaching *L. umbrinum* Pers.; 3440 m., on soil in forest, Laguna negra, Sierra de Santo Domingo, Edo. Mérida, 1.8.1958, *Dennis* 2518.

Lycoperdon pyriforme Pers., Syn. fung. 148 (1801)
c. 800 m., on rotten wood, Guatopo, Edo. Miranda, 25.6.1958, *Dennis* 1397; c. 2000 m., on cut surface of a stump, in cloud-forest, El Avila, Dto. Federal, 17.8.1958, *Dennis* 1823.

Received by Berkeley from Colonia Tovar and recorded from Venezuela by Coker & Couch.

Lycogalopsis solmsii* E. Fischer in Ber. Deutsch. Bot. Ges. **4, 192 (1886)
c. 800 m., on dead wood, Guatopo, Edo. Miranda, 22.6.1958, *Dennis* 1213; 27.6.1958, *Dennis* 1470.

SCLERODERMATACEAE

Scleroderma tenerum Berk. & Curt. in Journ. Linn. Soc. Bot. **10**, 346 (1868)
c. 950 m., Rio Chacaito, Caracas, 18.2.1949, *Dennis* 363.
Patouillard recorded *S. stellatum* Berk. from San Fernando de Atabapo.

NIDULARIACEAE

Crucibulum levis* (DC.) Kambly in Univ. Iowa Stud. Nat. Hist. **17, 167 (1936)
c. 1700 m., on chips of wood beside forest path, cloud-forest on west ridge of El Avila, Dto. Federal, 23.8.1958, *Dennis* 2351.

**Cyathus berkeleyanus* (Tul.) Lloyd Myc. writ. 2, Nidulariaceae 25 (1906)
c. 500 m., on log, Chichiriviche, Dto. Federal, 6.7.1958, *Dennis* 1348; 1200 m., on sticks, Cortada del Guayabo, Edo. Miranda, 9.7.1958, *Dennis* 1230A.

Cyathus intermedius* (Mont.) Tul. in Ann. Sci. Nat., Bot. Sér. 3, **1, 72 (1844)
900 m., bare soil of shady bank, Botanic Garden, Caracas, 20.8.1958, *Dennis* 2509.

Cyathus limbatus* Tul. in Ann. Sci. Nat., Bot. Sér. 3, **1, 78 (1844)
500 m., on log in coffee plantation, Chichiriviche, Dto. Federal, 6.9.1958, *Dennis & Aristeguieta* 1348A; 950 m., on sticks, Botanic Garden, Caracas, 18.8.1958, *Dennis* 2511; 1200 m., on dead sticks and garden litter, Cortada del Guayabo, Edo. Miranda, 9.7.1958, *Dennis* 1230.

Cyathus pallidus* Berk. & Curt. in Journ. Linn. Soc. Bot. **10, 346 (1868)
c. 1000 m., on decaying grass leaves on lawn, Los Palos Grandes, Edo. Miranda, 29.6.1958, *Dennis & Lasser* 1267; in clusters on bare sandy soil of roadside bank, same locality and date, *Dennis* 1266.

Cyathus poeppigii Tul. in Ann. Sci. Nat., Bot. Sér. 3, **1**, 77 (1844)
1200 m., on soil, Cortada del Guayabo, Edo. Miranda, 9.7.1958, *Dennis* 1498.

Fendler 240, presumably from the environs of Colonia Tovar, was referred to this species by Berkeley & Curtis.

**Cyathus triplex* Lloyd in Myc. Writ., Nidulariaceae 23 (1906)
900 m., on dead wood, Botanic Garden, Caracas, 12.7.1958, *Dennis* 1658.

Nidula niveo-tomentosa* (P. Henn.) Lloyd Myc. Writ. **3, 455 (1910)
3440 m., forest round Laguna negra, 1.8.1958, *Dennis* 1800A; 3700 m., second corrie south of Mucubaji, 25.7.1958, *Dennis & Buza* 2442; 3800 m., on dead sticks and logs in forest a little below Laguna de los Patos, Sierra de Santo Domingo, Edo. Mérida, 31.7.1958, *Dennis* 1800.

Sphaerobolus stellatus Tode ex Pers., Syn. meth. fung. 115 (1801)
3440 m., on rotten wood, Laguna negra, Sierra de Santo Domingo, 1.8.1958, *Dennis* 2510; 3450 m., fringe of the paramo, Sierra Nevada opposite Mérida, Edo. Mérida, 19.7.1958, *Dennis* 1695. Spores oblong-elliptic, 9–10 × 4–5μ.

Recorded by Coker from 1100–1350 m. in the state of Carabobo and abundant at sea-level in Trinidad.

Garden pests and diseases.*—This book is likely to prove extremely popular with both amateur and professional gardeners covering, as it does, so adequately in one small volume two such wide fields as 'Pests' and 'Diseases' of garden plants. It is attractively produced and is lavishly illustrated with photographs and line drawings of a very high standard.

The work is divided into two parts. The first, comprising 44 pages, is divided into six short chapters dealing with various aspects of control:—Methods, Chemicals, and Appliances used, the types of plant pest and disease, and finally a chapter devoted to winter spraying of fruit trees. The chapter on chemicals employed in controlling pests and diseases is particularly useful since it contains information on the strengths at which the various substances may be applied and directions for their preparation, together with notes on the unfavourable reaction of certain plants to some compounds. The second part consists of an alphabetical list of the pests and diseases.

Since the pests and diseases are listed alphabetically it is often difficult to trace them in the text, as the common names by which they are known in different parts of the country are apt to vary slightly and this may alter their expected sequence. To overcome this difficulty the authors have provided an index to host plants against which are shown the pests and diseases most likely to attack them together with their symptoms. Nevertheless, when using this index one must be prepared for some very general entries such as Annuals, Herbaceous Plants, Shrubs, Trees, etc. These contain references to pests and diseases of very great importance with wide host ranges which are not otherwise listed under particular hosts.

Brief accounts are given of the more common pests and diseases, which are divided into general information, description of the symptoms or pest, and control measures, with an additional section devoted to life histories of the pests. It should be noted that the authors state that they have omitted all pests and diseases relating to forest trees, grain crops and commercial forage crops. However, such trees as birch, ash, lime, etc., are included, although with practically no reference to the diseases which attack them. In contrast, the diseases of fruit-trees are adequately treated.

In conclusion it may be fairly stated that this is an extremely useful book containing a wealth of up to date information, presented in a pleasing style, which will appeal to all who have an interest in horticulture.

D. A. Reid

* *The Encyclopaedia of Garden Pests and Diseases*. By J. van Konynenburg and W. N. Lawfield. Pp. 215, many line drawings and half-tone text figures. London: W. H. & L. Collingridge Ltd., 1958. Price 42/-.

The status of the generic name *Anplectrum* A. Gray *(Melastomataceae)*

H. K. Airy Shaw

In a comparatively recent paper, Bakhuizen van den Brink fil. (Meded. Bot. Mus. & Herb. Utrecht, No. **91**, 24, 130: 1943) has adopted what is evidently an untenable position in regard to the name *Anplectrum* A. Gray. It has been suggested that a brief statement of the situation might be helpful.

In 1831, Blume (in Flora od. allg. bot. Zeit. **15**(2), 502) established the genus *Aplectrum* Bl. for three Melastomataceous plants (*A. viminale* (Jack) Bl., *A. rostratum* (Bl.) Bl., and *A. stipulare* (Bl.) Bl.) from the islands of Java and Sumatra.

In 1849, the same author (in Mus. Bot. Lugd.-Bat. **1**, 37–39) referred to it three additional species (*A. nodosum* (Korth.) Bl., *A. confine* Bl., and *A. pallens* Bl.) from Sumatra. The first two were compared respectively with *A. viminale* and *A. rostratum*.

In 1854, Asa Gray (U.S. Exploring Exped. under Wilkes, Bot., Phanerog., **1**, 597) described from Vanua Levu, in the Fiji Islands, an allegedly Melastomataceous plant, to which he gave the name *Anplectrum? ovalifolium*, sp. nov. In a footnote to the generic heading 'ANPLECTRUM', he explained the change of spelling thus: 'A slight change in the privative may render Blume's name, *Aplectrum*, sufficiently different from the earlier *Aplectrum* [sphalm. 'Aplectrun'] of Nuttall, which is apparently a good genus, of *Orchidaceae*, allied to *Corallorhiza*.' [The 'privative' refers to the negative element, *a-*, in the name *Aplectrum*, which signifies 'without a spur'; 'antherae . . . inappendiculatae' (Blume, 1831, *l.c.*).] In a further observation, Gray (*l.c.* 598) remarked: 'M. Naudin, who has obligingly examined the incomplete specimens of the collection, inclines to refer the plant to Blume's genus *Aplectrum*.'

In 1855, Miquel (Fl. Ned. Ind. **1**, 1, 553–555) took up Blume's six species, under the name *Aplectrum* Bl.; but at the conclusion of the volume (*l.c.* 1098: 1858), under 'Addenda et emendanda', he added the note: 'p. 553 [sphalm. '551']. *Aplectri* (propter homonymum Nuttallianum haud servandi) loco: ANPLECTRUM A. GRAY'. This may be translated: 'In place of *Aplectrum* (which cannot be kept owing to the homonym of Nuttall), substitute *Anplectrum* A. Gray'.

It is thus clear that the generic name *Anplectrum* A. Gray was a direct re-naming of *Aplectrum* Bl., on account of the existence of the earlier homonym *Aplectrum* (Nutt.) Torr. (Comp. Fl. N. Midl. States 322: 1826; *Corallorhiza* subgen. *Aplectrum* Nutt., Gen. **2**, 197: 1818), a genus of *Orchidaceae*.

Bakhuizen fil., in the paper above referred to, has treated *Anplectrum* A. Gray as a new genus, based upon the Fijian species *Anplectrum? ovalifolium* A. Gray, and has therefore (*l.c.* 130) re-named '*Anplectrum* A. Gray (pr. p.; typo excl.)'—i.e. *Anplectrum* auctt., non A. Gray; *Aplectrum* Bl., non (Nutt.) Torr.—as '*Backeria* Bakh. f., genus novum'. On an earlier page (*l.c.* 24), he half explains the situation thus:

'*Backeria* comprehends *Aplectrum* Bl. (in Flora [1831] not in Mus. Bot. Lugd.-Bat.* [1849]) and some of the species referred to *Anplectrum* A. Gray by Triana and others. The genus had to be renamed because *Aplectrum* Bl. (1831) is a later homonym of *Aplectrum* Nutt. (1818), which is an orchid, while *Anplectrum* A. Gray is a genus of dubious character. It was based on *A. ovalifolium*, a plant from the Viti Islands . . . No material of this species was available to me, but on account of the data contained in the authentic description and also on account of its habitat, it seems to me that *Anplectrum ovalifolium* A. Gray cannot be regarded as congeneric with the species described by Triana . . . The plant might be a representative of the *Astronioïdeae*, but it is possible that it does not belong to the *Melastomataceae* at all.

'The new name for this genus has been chosen in honour of . . . . Dr. C. A. Backer'.

There are, in fact, evidently no grounds at all for regarding *Anplectrum* A. Gray as a new genus. The quotations from Asa Gray (and also from Miquel), given above, make that author's intentions abundantly clear. Bakhuizen's re-naming of *Aplectrum* Bl. as *Backeria* Bakh. f. was therefore superfluous. The quite simple synonymy is as follows:—

Anplectrum *A. Gray*, U.S. Expl. Exped. Wilkes, Bot., Phan., **1**, 597 (1854), *pro nom. nov.*: *Aplectrum* Bl., non Torr.
Aplectrum Bl. in Flora (Bot. Zeit.) **15**(2), 502 (1831), & in Mus. Bot. Lugd.-Bat. **1**, 37 (1849); non (Nutt.) Torrey (1826)
Backeria Bakh.f. in Meded. Bot. Mus. & Herb. Utrecht, No. **91**, 23, 130 (1943), *nom. nov. superfl.*

1. **Anplectrum stipulare** (*Bl.*) *Triana* in Trans. Linn. Soc. Lond. **28**(1), 84 (1871)
Melastoma stipulare Bl., Bijdr. (17), 1073 (1826)
Backeria stipularis (Bl.) Bakh. f., *l.c.* 132.
Distribution. Java.

2. **Anplectrum viminale** (*Jack*) *Triana*, *l.c.*
Melastoma viminalis [sic] Jack in Trans. Linn. Soc. Lond. **14**(1), 16 (1825)
Backeria viminalis (Jack) Bakh. f., *l.c.* 133.
Distribution. Sumatra, Billiton; Siam?.

var. **confine** ([*Bl.*] *Miq.*) *Airy Shaw*, comb. nov.
Melastoma rostratum Bl., Bijdr. (17), 1074 (1826)
Aplectrum confine Bl. in Mus. Bot. Lugd.-Bat. **1**, 38 (1849)
A. pallens Bl. var. *confinis* [sic] (Bl.) Miq. Fl. Ned. Ind. **1**, 1, 554 (1855)
Backeria viminalis (Jack) Bakh. f. var. *rostrata* (Bl.) Bakh. f., *l.c.* 134, *comb. illegit.*
Distribution. Sumatra, Malay Penins., SE. Borneo, Java.

The above new varietal combination is necessitated by the fact that the earliest *varietal* epithet for this taxon is that provided by *Aplectrum pallens* var. *confinis* (Bl.) Miq. (1855). The fact that the epithet *rostrata*, used by Bakhuizen, dates from 1826 is immaterial, since this was in a *specific* combination; it had apparently never been used as a varietal epithet previously to 1943.

* The meaning of this reservation is not clear, since of the three species referred by Blume to *Aplectrum* in 1849, Bakhuizen includes two (*A. confine* and *A. pallens*) in the synonymy of *Backeria viminalis* and its var. *rostrata*, and only excludes one—*A. nodosum*—which he refers to the genus *Dissochaeta* Bl. (Bakh. *l.c.* 232).

The identity and nomenclature of *Thladiantha dubia (Cucurbitaceae)* of the 'Flora of British India'

C. Jeffrey & K. Kashyapa (C.S.I.R., India)

Thladiantha dubia Bunge (1833) was first recorded from northern China. The male plants of this species have been reported to occur more commonly than the female. A *Thladiantha* species found in Eastern Bengal and Assam, ascending to c. 2400 m., likewise has female plants more rarely reported and it was first identified by W. J. Hooker (1864) as *T. dubia* Bunge. C. B. Clarke (1879) accepted this identification and also cited as synonyms *Gymnopetalum horsfieldii* Miq. and *G. piperifolium* Miq. However, Cogniaux (1880) pointed out that the Indian plant differed from the Chinese plant in its fruit, that of the former being fenestrately ridged, that of the latter being merely obscurely longitudinally ridged. On this basis he considered them specifically distinct and gave the name *T. calcarata* to the Indian plant. Later (1881) he separated the two species on the characters of the male inflorescence, describing *T. dubia* as having ebracteate solitary flowers, and *T. calcarata* as bearing axillary racemes with prominent laciniate bracts. Furthermore he mentions *G. horsfieldii* and *G. piperifolium* as synonymous to another species maintained by him, *T. cordifolia* (Bl.) Cogn., from Indonesia. In fact *T. calcarata* and *T. cordifolia* are so very similar that *G. horsfieldii* and *G. piperifolium* can be fitted into one or the other. *T. calcarata* and *T. cordifolia* have been distinguished as in Table 1.

Table 1. Characters used to distinguish *T. calcarata* from *T. cordifolia*

	T. calcarata	*T. cordifolia*
Leaves	Denticulate	Crenate-dentate
Male receptacle	Broadly campanulate, densely villose	Narrowly campanulate, sparsely hairy
Sepals	Linear	Broadly lanceolate

A review of the herbarium sheets at Kew shows intermediate plants between the extremes of *T. calcarata* and *T. cordifolia*. If *T. calcarata*, *G. horsfieldii*, *G. piperfolium* and *T. cordifolia* be grouped together there seems to be little doubt as to their being geographical and ecological variants of one another. The minor morphological differences between *T. calcarata* and *T. cordifolia* hardly justify their recognition as two distinct species. The correct name and synonymy of the Indian plant, therefore, is as follows:—

Thladiantha cordifolia (*Bl.*) *Cogn.* in DC., Mon. Phan. **3**, 424 (1881)

Luffa cordifolia Bl., Bijdr. 929 (1826); Seringe in DC., Prodr. **3**, 302 (1828); Roem., Fam. **2**, 63 (1846); Miq., Fl. Ind. Bat. **1**, i, 666 (1855)
Momordica calcarata Colebr. in Wall., Cat. No. 6740, *nomen nudum*
Trichosanthes javanica Miq., Fl. Ind. Bat. **1**, i, 678 (1855)
Gymnopetalum horsfieldii Miq., *l.c.*, 680 (1855)
Gymnopetalum piperifolium Miq., *l.c.*, 680 (1855)
[*Thladiantha dubia* sensu Hook. in Bot. Mag. t. 5469 (1864), *pro parte*, excl. pl. masc; & sensu C. B. Cl. in Hook.f., Fl. Br. Ind. **2**, 631 (1879); non Bunge]
T. calcarata C.B.Cl. in Journ. Linn. Soc. Bot. **15**, 26 (1876), *nomen nudum*; Chakravarty, Mon. Ind. Cucurb. 125 (1959)
T. calcarata Cogn. in Hook.f., Fl. Br. Ind. **2**, errata (1880)

The main differences between *T. cordifolia* and *T. dubia* Bunge, viz., the laciniate bracts, and axillary racemes of the male flowers, and the ridged fruit, of the former species, as compared with the ebracteate, solitary axillary flowers and the obscurely ridged fruit of the latter, may also be due more to geographical variation than to the existence of two morphologically distinct species. The distinguishing characters, which appear important at the first sight, may not be actually so at a closer examination, for in the other closely allied species of the family *Cucurbitaceae* both bracteate and ebracteate flowers arise from the same axil, and in *Gymnopetalum cochinchinensis* (Lour.) Kurz young male plants often produce solitary ebracteate flowers, as in *T. dubia* Bunge, whilst older plants often bear axillary racemes of flowers with gashed bracts as in *T. cordifolia*. Similarly, in some species of the African genus *Peponium* Engl. the male flowers may be either solitary and ebracteate, as in the Chinese plant, or in bracteate racemes, as in the Indian plant, and both conditions may sometimes be found at the same axil. Moreover, the Indian and the Chinese plants are linked by the intermediate *T. villosula* Cogn. which is said to have axillary racemes or cymes of male flowers having small bracts or no bracts. *T. villosula* is not only intermediate between *T. dubia* and *T. cordifolia* morphologically, but its occurrence in Central China as compared to northern China and Japan in the case of *T. dubia* Bunge, and India, Indo-China, and Indonesia in the case of *T. cordifolia*, also places it in between the two latter species distributionally. The fruit character is also highly variable in the genus, and the absence of fruiting specimens of *T. dubia* Bunge and of male plants of *T. villosula* in the Kew herbarium make it difficult to arrive at a definite conclusion on the relationship between *T. dubia* Bunge and *T. cordifolia* (Bl.) Cogn.; but the probability of *T. dubia*, *T. villosula* and *T. cordifolia* all being synonymous cannot be ignored.

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'Aphananthe' lissophylla Gagnep. (**Ulmaceae**).—This species was described by Gagnepain (in Bull. Soc. Bot. France, **72**, 804: 1926) with the following comment: 'Cette espèce avait été placée par Pierre, comme nouvelle, dans le genre *Gironniera* ? section *Gagnantia*, ou genre nouveau. A n'en pas douter, c'est un *Aphananthe*, bien distinct de tous ceux actuellement connus.' Recent inspection of the type collection (*Balansa* 2452, from Tonkin) shows that it is, in fact, a *Gironniera*. I refer it to *G. cuspidata* (Bl.) Kurz, a species apparently distributed from the Bombay Presidency of India to S. China and W. Malaysia (Philippines to Java). Pierre's section *Gagnantia* appears to have been unpublished. The relevant synonymy is as follows:—

Gironniera cuspidata (*Bl.*) *Kurz*, Prelim. Rep. For. Veg. Pegu, App. B, 87 (1875), *in clavi*, & For. Fl. Brit. Burma **2**, 470 (1877)
Cyclostemon cuspidatum Bl., Bijdr. 599 (1825)
Gironniera reticulata Thw., Enum. Pl. Zeyl. 268 (1859–64); Hook. f. in Hook. f., Fl. Brit. Ind. **5**, 486 (1888); Gagnep. in Lecomte, Fl. Gén. Indoch. **5**, 676 (1927)
? *G.* ? *nitida* Benth., Fl. Hongk. 325 (1861)
? *G. lucida* Kurz, Prelim. Rep. For. Veg. Pegu, App. A, p. cxvi (1875), *nomen*; For. Fl. Brit. Burma, **2**, 470 (1877), *descr.*; Parkinson, For. Fl. Andaman Is. 246 (1923)
Aphananthe lissophylla Gagnep. in Bull. Soc. Bot. France, **72**, 804 (1926) & in Lecomte, Fl. Gén. Indoch. **5**, 690 (1928), **synon. nov.**
? *Gironniera thomsoni* King ex A. M. & J. M. Cowan, Trees N. Bengal 122 (1929), *nomen.*

The status of *G. nitida* Benth., from Hongkong, and of *G. lucida* Kurz, from the Andaman Islands, requires further investigation. *Aphananthe lissophylla* actually agrees better with this very smooth and polished-leaved form than with the reticulate-leaved type represented by *G. cuspidata* (Bl.) Kurz. But whether the two forms are specifically distinct, or represent perhaps stages in development, is something that probably needs study in the field.

H. K. Airy Shaw

A key to the species of *Platysepalum* Baker, with notes

J. B. Gillett

Since *Platysepalum* was described by J. G. Baker (1871) three accounts of the genus with keys to the species have been published, by Taubert (1896), De Wildeman (1925) and E. G. Baker (1929). Since 1929 a few further species have been published and Professor L. Hauman (1954) has revised much the greater part of the genus. In preparing an account of the genus for the 'Flora of Tropical East Africa' it was necessary to investigate the differences between the East African *P. inopinatum* and the other species of the genus and, when so much of the spade work had been done by Professor Hauman and others, it seemed unfortunate that no workable key to the whole genus should exist. The following key, which is essentially a modification and extension of that of Professor Hauman to make it cover the whole genus, was therefore prepared. It is not the result of an independent revision of the genus; Professor Hauman's taxonomic decisions being (with one minor exception) accepted as they stand. All specimens cited have been seen except those marked with an asterisk (*), and are at Kew, unless otherwise indicated.

Bracteoles over 3 mm. long, broad enough to enclose the base of the flower-bud:

*Calyx 25–28 mm. long; bracteoles up to 20 mm. long; leaflets c. 4-jugate, rusty tomentose beneath . . . . . 1. *ferrugineum*

*Calyx 18–22 mm. long; bracteoles 10–12 mm. long; leaflets 3–4-jugate (or rarely 2–, 5–, or 6-jugate):

Leaflets rusty tomentose, or with appressed golden hairs about 0·5 mm. long, beneath:

Bracteoles elliptic, completely enclosing the young buds, their dense golden-brown indumentum markedly shorter and less coarse than that of the calyx; floriferous branchlets of the inflorescence much reduced, under 1 cm. long . . . . . 2. *hirsutum*

Bracteoles ovate-acuminate, not completely enclosing the young buds, their indumentum similar to that on the calyx; floriferous branchlets less reduced, often over 1 cm. long . 3. *pulchrum*

Leaflets shortly puberulous and sub-scabrid to the touch beneath . . . . . 4. *scaberulum*

*Calyx 13–17 mm. long; bracteoles 3–10 mm. long; inflorescence clearly paniculate, the floriferous branches not much reduced:

Leaflets 2-jugate . . . . . 5. *cuspidatum*

Leaflets (2)–3–4-jugate, the hairs on their lower surface appressed and usually under 0·5 mm. long . . . . . 6. *violaceum*

Bracteoles 7–10 mm. long . . . . . α var. *violaceum*

Bracteoles 3–5(–7) mm. long . . . . . β var. *vanhouttei*

Bracteoles under 3 mm. long, usually narrower than the base of the bud:

†Flowers 13–17 mm. long; inflorescence clearly paniculate, the floriferous branches not reduced to mere knobs:

Bracteoles rather persistent; appressed hairs on lower surface of leaves whitish, rather sparse, and usually under 0·4 mm. long . . . . . 6. *violaceum* var. *vanhouttei*

Bracteoles very caducous; appressed hairs on under surface of leaves more or less yellow and c. 0·5 mm. long:

Leaflets 3–4-jugate . . . . . 7. *chevalieri*

Leaflets 5–6-jugate, densely golden haired beneath . 8. *chrysophyllum*

†Flowers 17–30 mm. long; bracteoles fairly persistent; leaflets neither glabrous, nor almost so, beneath:

Leaflets 6–8-jugate, pubescent with spreading hairs beneath and, often, above; floriferous branches well-developed, not reduced to knobs . . . . . 9 *vanderystii*

Leaflets 2–3-jugate, glabrous above and with short appressed hairs beneath; floriferous branchlets reduced almost to knobs, except for one or two of the lower ones, the inflorescence thus appearing subracemose . . . . . 10. *inopinatum*

†Flowers 24–30 mm. long; leaflets glabrous above and almost so beneath; floriferous branchlets much reduced, except for a few at the base of the inflorescence:

Leaflets whitish beneath, subcordate at the base; the 3 lower calyx-lobes approximately equal in length . . . . 11. *hypoleucum*

Leaflets green beneath, rounded at the base; lowest calyx-lobe distinctly longer than the lateral lobes . . . . . 12. *poggei*

Enumeration of species

1. **Platysepalum ferrugineum** *Taub.* in Engl., Bot. Jahrb. **23**, 186 (1896); Fl. Congo Belge **5**, 68 (1954)

Congo Republic, Lualaba R., 4° 15′ S., *Pogge* 799 (B, holotype).

The type has been destroyed and the species has not been collected again. Its relationship with *P. pulchrum* needs investigation.

2. **P. hirsutum** (*Dunn*) *Hepper* in Kew Bull. **11**, 122 (1956); Fl. W. Trop. Afr., ed. 2, **1**, 524 (1958)

Millettia hirsuta Dunn in Journ. Linn. Soc. Bot. **41**, 208 (1912)

Guinea Republic to Ghana. Ivory Coast, *Chevalier* 16829 (K, photo., P*); 22640 (P*); 22644 (K, photo. & fragment, P*).

3. **P. pulchrum** *Louis ex Hauman* in Bull. Soc. Roy. Bot. Belg. **86**, 281 (1954); Fl. Congo Belge **5**, 67, t. 4 (1954)

Congo Republic, *Gillardin* 233; *Louis* 6386, 6524, 7162, 7768, 11663 (BR*, holotype, BM, K, isotypes), 12488, 12702, 16341, 16508.

4. **P. scaberulum** *Harms* in Engl., Bot. Jahrb. **49**, 438 (1913)

Cameroons, between Ebolowa and Sangmelima c. 3° N., 11° 30′ E., *Mildbraed* 5529 (B*, holotype).

No specimen has been seen: it is difficult from the description only to assess the importance of the difference in the indumentum of the leaves, which alone seems to separate this species from *P. pulchrum*.

5. **P. cuspidatum** *Taub.* in Engl., Bot. Jahrb. **23**, 186 (1896); Fl. Congo Belge **5**, 65 (1954)

Congo Republic, Samba, east of Lualaba R., 4° 15′ S., *Pogge* 736 (B*, holotype).

The type has been destroyed and the species has not been collected again. Professor Hauman considers that this may be simply a form of *P. violaceum*, which does sometimes show 2-jugate leaves.

6. **P. violaceum** *Welw. ex Baker* in Fl. Trop. Afr. **2**, 121 (1871); Fl. Congo Belge **5**, 64 (1954)

α var. **violaceum**

P. violaceum var. *angustibracteatum* De Wild., Pl. Beq. **3**, 373 (1925)
P. violaceum var. *bequaertii* De Wild. ibid. 374 (1925)

Congo Republic: Yangambi, *Louis* 898, 2924, 7356, 14312; Djombo, *Mengi* 28 (BR*, holotype of var. *angustibracteatum*); Yambuya, *Bequaert* 1313 (BR*, holotype of var. *bequaertii*): Angola, Golungo Alto, *Welwitsch* 1838 (BM, K, isotypes).

β var. **vanhouttei** (*De Wild.*) *Hauman* in Fl. Congo Belge **5**, 65 (1954); Fl. W. Trop. Afr., ed. 2, **1**, 524 (1958)

P. vanhouttei De Wild. in Ann. Mus. Congo Belge, Bot. Sér. **5**(1), 260 (1906)
P. ledermannii Harms in Engl., Bot. Jahrb. 49, 437 (1913)
P. polyanthum Harms, ibid. (1913); Pellegrin, Leg. Gabon 242 (1949)
P. tessmannii Harms, ibid. (1913); Pellegrin, ibid. (1949)
P. tessmannii var. *longibracteolatum* Pellegrin, ibid. (1949)

S. Nigeria: Br. Cameroons: Cameroun Rep., *Mildbraed* 3924 (B*, holotype of *P. polyanthum*: Spanish Guinea, *Tessmann* 511 (B*, holotype, K, isotype of *P. tessmannii*): Gabon, *Le Testu* 2046, 7585 (P*, holotype, K, isotype of var. *longibracteolatum*), 8532: Congo Republic, *Ledermann* 22 (B*, holotype of *P. ledermannii*), *Vanhoutte in Gillet* 3660 (BR*, holotype), *Vermoesen* 1707, *Wagermans* 810, *Gillardin* 440, *Robyns* 976, *Toussaint* 2317: Portuguese Congo, *Gossweiler* 8053, 9025, 9191: Angola, *Gossweiler* 9860.

P. violaceum var. *vanhouttei* varies considerably in the size of the bracteoles, approaching var. *violaceum* on the one hand and *P. chevalieri* on the other. It thus breaks down any clear distinctions between the sections *Typicae* and *Brevibracteolatae* into which Harms (1915) divided the genus.

7. **P. chevalieri** *Harms* in Engl., Bot. Jahrb. **40**, 37 (21.5.1907) & Bull. Soc. Bot. France **61**, Mem. **8b**, 15 (1.8.1907); Fl. Congo Belge **5**, 66 (1954)
P. chevalieri var. *aureum* Hauman. in Bull. Soc. Roy. Bot. Belg. **86**, 282 (1954); Fl. Congo Belge **5**, 67 (1954)

Ubangi, *Chevalier* 10983, 10984, 11002 (all P* syntypes): Congo Republic, *Lebrun* 1254, 1783; *Humbert* 40; *Louis* 270, 11573, 7517 (BR*, holotype, BM, K, isotypes of var. *aureum*); *Staner* 1590, *Corbisier Boland* 868, *Dubois* 898, *De Saeger* 60.

8. **P. chrysophyllum** *Hauman* in Bull. Soc. Roy. Bot. Belg. **86**, 281 (1954); Fl. Congo Belge **5**, 67 (1954)

Congo Republic, *Lebrun* 5230 (BR*, holotype, BM, K, isotypes).

The distinction between this species and *P. chevalieri* hardly seems tenable. *P. chevalieri* var. *aureum* Hauman shows the golden leaflet-indumentum of *P. chrysophyllum* but has the 4-jugate leaflets of *P. chevalieri*. *Dubois* 898 on the other hand has 5-jugate leaflets as in *P. chrysophyllum* but the indumentum of *chevalieri*. Thus the two characters used to differentiate *P. chrysophyllum* in fact vary independently of each other.

9. **P. vanderystii** *De Wild.* in Bull. Jard. Bot. Et. Brux. **5**, 18 (1915) & 263 (1916); Fl. Congo Belge **5**, 70 (1954)

Congo Republic, Brazzaville, *Chevalier* 27346: Congo Republic, *Germain* 2153, *Vanderyst & Polis* s.n. (BR*, holotype).

10. **P. inopinatum** *Harms* in Notizbl. Bot. Gart. Berlin **12**, 510 (1935)

Tanganyika: near Dar es Salaam & Pugu hills, *Kirk* s.n.; *Semsei* 1291, 1347; *Vaughan* 3129, 3135: near Lindi, *Schlieben* 5392 (B*, holotype, EA*, K, isotypes).

Portuguese East Africa: Niassa Province, *Mendonça* 993, etc.

The statement in Harms' description that the leaflets are subglabrous beneath is wrong. There is a fairly dense appressed indumentum over the whole lower surface of the leaf in the isotype and all other specimens seen.

11. **P. hypoleucum** *Taub.* in Engl., Bot. Jahrb. **23**, 186 (1896); Fl. Congo Belge **5**, 71 (1954)

Congo Republic: Mukenge, *Pogge* 816 (B*, holotype), *Bequaert in Harv. Med. Exped.* 1.

12. **P. poggei** *Taub.* in Engl., Bot. Jahrb. **23**, 185 (1896); Fl. Congo Belge **5**, 71 (1954)

Congo Republic: Mukenge, *Pogge* 901 (B*holotype), *Renier* 121.

It is possible that this species and the last will prove to be conspecific when more abundant material becomes available.

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Vistas in botany.*—Reviews of the progress made in various fields have become a commonplace of scientific literature and little stimulation appears to be needed to initiate a book of this kind. The two hundredth anniversary of the Royal Botanic Gardens, Kew has provided an unusually good pretext for compiling a review of recent advances in botany for, apart from its major work in plant taxonomy, Kew has been an important influence on the development of plant morphology and anatomy, on palaeobotany and to a lesser extent on plant physiology and other disciplines.

The volume opens, appropriately, with a chapter on taxonomy, contributed by Professor H. J. Lam of Leiden. After discussing various static and dynamic aspects of taxonomy, he reaches the conclusion that the criteria on which Angiosperm classification is based depend upon intuitive judgments, although they are the result of much sublimated experience. Attempts to

* *Vistas in Botany*. A volume in honour of the Bicentenary of the Royal Botanic Gardens, Kew. Edited by W. B. Turrill. Pp. xv + 547, 15 half-tone plates, 20 text-figures. London: Pergamon Press, 1959. Price £5.

find a more objective basis for taxonomy, such as that of Sporne, have not been altogether successful. Statistical treatments, to be valid, must be founded on sound premises. Probably these will not be developed until a sufficient number of fossil plants has been discovered and correctly interpreted. In the meantime, the origin of the Angiosperms remains, as in Darwin's day, an 'abominable mystery'.

Information from other branches of botany is being employed more and more by taxonomists in the solution of problems of classification and this tendency is brought out especially in the chapters on plant anatomy by Dr. C. R. Metcalfe and plant biochemistry by Dr. E. C. Bate-Smith. The link with Kew is strongest in anatomy, starting with the foundation of the Jodrell Laboratory in 1876 and continuing in recent years with the revision of Solereder's monumental work on plant anatomy by Metcalfe and Chalk. The appreciation of the value of biochemistry in taxonomic studies developed later, partly on account of the great advances made in this field in recent years, but partly, also, by the hiding of taxonomic information by the indiscreet choice of chemical names. Already some interesting light on plant relationships has followed on the study of the distribution of alkaloids and of leuco-anthocyanins in the Angiosperms. As biochemical knowledge expands we may look forward to an increasing use of chemical data in taxonomy.

The plant sociological aspects of ecology are discussed by Professor J. Braun-Blanquet in German; the only chapter not in English. Almost every other aspect is touched upon by Sir E. J. Salisbury in his thought provoking chapter on causal plant ecology. This ranges from climatic interactions to the part played by micronutrients in the distribution of species and plant communities. The broader relationships of plant distribution are considered by Dr. W. B. Turrill under the heading of plant geography. The floras of the several plant regions or phytochoria are reviewed in turn and then some special aspects of phytogeography including ranges and continental drift. Turrill objects to the term 'bipolar distribution' for discontinuous distributions in both northern and southern hemispheres, but his proposal to use 'bihemispherical ranges' instead is not a happy solution of this nomenclatural problem. Such ranges are not global, though they might be called *utrinquitous* to the equator or the tropics.

Three short chapters on palaeobotany, cytology and genes, chromosomes and evolution are then followed by a series dealing with the lower organisms, beginning with viruses and bacteria and leading up by way of Algae, Fungi, Bryophytes and Ferns to Gymnosperms. Together these present a stimulating picture of the advances made in their particular branches of botanical science.

In glancing thus over the whole field covered by this book one is struck by the increasing interdependence of different aspects of botanical studies. No longer is it possible to study a 'pure' taxonomy or anatomy or cytology in isolation. The various botanical disciplines interact with one another and often where one overlaps another the greatest strides are being made. The periodical survey of such a wide field is a salutary operation and one which should appeal to the majority of botanists.

R. Melville

Notes on Malaysian *Euphorbiaceae**

H. K. Airy Shaw

XVI. ON THE IDENTITY OF THE GENUS ARACHNODES GAGNEP.

(P. & H. 29, Sect. xviii.)

In describing the genus *Arachnodes*, with the sole species *A. chevalieri*, Gagnepain gave it as his opinion that, from the nature of the inflorescence and the characters of the androecium, the genus came near to *Trigonostemon* Bl.

By the kindness of the Director of the Paris Herbarium, I have been able to examine the type material, and find that Gagnepain's genus is synonymous with *Phyllanthodendron* Hemsl. Why Gagnepain should have suggested a relationship with *Trigonostemon* (Tribe *Clutieae*) is incomprehensible, since the excellently preserved type specimen (*Chevalier* 31755) clearly indicates a representative of the Tribe *Phyllantheae*.

In Croizat's treatment of the genus *Phyllanthodendron* (Journ. Arn. Arb. **23**, 32–37: 1942), *Arachnodes chevalieri* clearly belongs in Sect. *Euphyllanthodendron* Croiz., *i.e.* Sect. *Phyllanthodendron*, the type section of the genus. It is closely related to *Ph. lingulatum* (Beille) Croiz.,† *Ph. poilanei* (Beille) Croiz.† and *Ph. coriaceum* Gage, all included by Croizat in this section. It would not be surprising if at least the first two of these taxa turned out eventually to be forms of one variable species. As, however, Croizat, on the basis of the examination of rather copious material in the Arnold Arboretum and Paris Herbaria, retains them as distinct, it would seem advisable for the present to keep *A. chevalieri* distinct also. The representation of these species in the Kew Herbarium is very poor. *Ph. coriaceum*, in its more coriaceous leaves with elevate-reticulate venation on the lower surface, stands somewhat apart from the other three.

I believe, however, that Croizat's sectional arrangement needs modification. The type species of the genus *Phyllanthodendron* is *Ph. mirabile* (Muell.-Arg.) Hemsl., concerning which Croizat rather naively remarks (*l.c.* 34): 'I place this in *Euphyllanthodendron* from the description and illustration.' It is difficult to see where else the type species could be placed, other than in the type section! *Ph. mirabile* is, however, morphologically such an isolated species in the genus that the Section *Phyllanthodendron* should be limited to it alone. I propose the establishment of the Section *Arachnodes* (Gagnep.) Airy Shaw for the remaining species of Croizat's Sect. *Euphyllanthodendron*.

Sect. **Phyllanthodendron** (*sensu restricto*).

Sect. *Euphyllanthodendron* Croiz., *l.c.* 33, 34, *pro minore parte*.

Arbor erecta, trunco simplici, ramis apicalibus fasciculatis. *Rami* biformes, steriles et floriferi: steriles arcuati et penduli, puberuli. foliis majoribus;

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* Continued from Kew Bull. **14**, 397 (1960)

† It may be noted that Croizat, throughout his paper, cites all Beille's species as from Lecomte, Fl. Gén. Indoch. **5**, 591–3 (1927). He appears to have overlooked Beille's preliminary paper in Bull. Soc. Bot. France **72**, 158–163 (1925), in which these species were first described, and in which a rather full discussion is given of the characters of *Phyllanthus* Sect. *Phyllanthodendron* (Hemsl.) Beille, and of the included species.

floriferi graciliores, suberecti, subglabri, foliis minoribus, parte inferiore interdum aphylli. *Folia* ramorum sterilium tenuiter chartacea vel subpapyracea, basi valde inaequaliter cordata, subtus glauca et molliter puberula, breviter petiolata; ramorum floriferorum tenuissima, basi cuneata, subtus subglabra, longiuscule petiolata; stipulae conspicuae, subulatae, valde reflexae, persistentes. *Inflorescentiae* axillares et extra-axillares, fasciculiformes, pauciflorae (3–6), secus ramos floriferos crebriuscule dispositae. *Pedicelli* brevissimi vel subnulli. *Sepala* 5–6, aequalia, longe caudata. *Styli* elongati, alte bifidi, divaricati, ovario longiores.

Typus (species unica): *Ph. mirabile* (Muell.-Arg.) Hemsl.—SW. Siam.

In establishing his Sect. *Euphyllanthodendron*, Croizat designated as type species, not *Ph. mirabile*, but *Ph. lingulatum* (Beille) Croiz. This, of course, is an irregular and inadmissible procedure. The prefix *Eu-* should always indicate the subdivision which includes the type of the generic name. Croizat did, in fact, include *Ph. mirabile* in this group, but only casually, as it were by accident. The designation of *Ph. lingulatum* as type must therefore be ignored.

Sect. **Arachnodes** (*Gagnep.*) *Airy Shaw*, sect. nov.

Arachnodes Gagnep., in Not. Syst. **14**, 32 (1950).

Frutices vagi vel semi-scandentes, rarius suberecti, vel interdum arborei. *Rami* normales, uniformes. *Folia* chartacea vel coriacea, basi aequalia vel levissime inaequalia, haud cordata, glabra, subtus saepe minutissime cereo-papillosa; stipulae inconspicuae, erecto-adpressae. *Inflorescentiae* axillares, fasciculatae, multiflorae, vel e floribus ♂ 15–20 et ♀ perpaucis (1–3), vel e masculis tantum, rarius ut videtur e femineis tantum sistentes. *Pedicelli* ♂ filiformes, elongati, ♀ valde abbreviati, multo crassiores. *Sepala* 6, exteriora longissime, interiora breviter caudata. *Styli* crassi, valde abbreviati, stigmatibus breviter bifidis fere sessilibus ovario multo brevioribus.

Typus: *Ph. chevalieri* (Gagnep.) Airy Shaw.

Phyllanthodendron (Sect. **Arachnodes**) **chevalieri** (*Gagnep.*) *Airy Shaw*, comb. nov.

Arachnodes chevalieri Gagnep., *l.c.*

S. Indo-China (Cambodia).

When describing this plant, Gagnepain stated that the female flower and inflorescences were unknown. Examination of the type material shows, however, that there are in fact a number of ♀ flowers on the specimen. They are somewhat inconspicuous, a single ♀ being found in the centre of a fascicle of many ♂ flowers, and that only in a few inflorescences towards the apex of the branches. They immediately attract attention, however, by their considerably larger size, their much shorter and stouter pedicel, and their more copious indumentum. A description is supplied herewith.

Flores ♀ hinc inde in mediis fasciculis ♂ solitarii. *Pedicellus* 1·5–2 mm. longus, dense breviter patule pubescens, quam pedicellus ♂ duplo triplove crassior. *Tepala* basi brevissime connata. *Tepala exteriora* anguste lanceolata, 5–7 mm. longa: limbus c. 3 mm. longus, 1 mm. latus, oblanceolatus, margine membranaceo, dorso secus nervum puberulus, in aristam linearifiliformem 3–5 mm. longam glabram desinens. *Tepala* interiora oblanceo-

lata, 3–3·5 mm. longa, 1 mm. lata, glabra, apice cuspide vel spinula brevi acutissima fusca patula terminata, margine membranaceo minutissime erosulo-fimbriato. *Staminodia* 6, minutissima, tenerrima, aegre visibilia, 0·5 mm. longa, filiformia, anguste clavata, cum tepalis alternantia et iis breviter adnata. *Ovarium* parvum, breviter obovoïdeum, 1–1·25 mm. longum et latum, trilobum, 3-loculare, inferne glabrum, superne longe pubescens, pilis caducis e foveolis sub magnificationem fortem distinctis exortis. *Stylus* crassus, abbreviatus, subnullus, cum stigmatibus vix 0·5 mm. altus, glaber; lobi stigmatici distincti, U-formes, laterales, superne in apices breves subacutos 2 producti, velut massam breviter 6-cornutam efformantes. *Ovula* 2 pro loculo, elongata, pendula.

A new combination is apparently required for *Phyllanthodendron coriaceum* Gage (1922), since Ridley, *l.c. supra*, cites in synonymy under this species his own much earlier published *Cleistanthus? minutiflorus* (1911). I have not seen the gatherings from Lower Siam and Pahang upon which this name was based, but I have no reason to doubt Ridley's reduction, since the description (so far as it goes) agrees quite well.

Phyllanthodendron (Sect. **Arachnodes**) **minutiflorum** (*Ridl.*) *Airy Shaw*, comb. nov.

Cleistanthus? minutiflorus Ridl. in Journ. Str. Br. Roy. As. Soc. No. **59**, 169 (1911)

Phyllanthodendron coriaceum Gage in Rec. Bot. Surv. Ind. **9**, 219 (sphalm. '*P. dubium*' [alterum]), et in indice, post p. [250] (1922); Ridl. Fl. Mal. Penins. **3**, 205 (1924); Croizat, *l.c. supra*, 35

Lower Siam; Pahang; Perak.—Ridley's citation of 'Annam' is an error for Tonkin (*vide* Gage, *l.c.*), but the specimen forming the basis of this record (*Balansa* 3290) is referable to *Ph. lingulatus* or *Ph. poilanei*; cf. Croizat, *l.c.* 34, 35.

Croizat comments on the fact that *Ph. lingulatum* (Beille) Croiz. appears to prefer 'the rich soil of decomposed basalt in the primitive forest' of the southern, 'strictly tropical' parts of Indo-China, whereas *Ph. poilanei* (Beille) Croiz. is found on shallow calcareous soil in the more northern regions. *Ph. minutiflorum* appears to be definitely associated with limestone rocks in the northern and central parts of the Malay Peninsula.

The following is a very tentative key to the species of Sect. *Arachnodes*.

Leaves stiffly coriaceous; tertiary nerves conspicuously elevate and reticulate below; cartilagineous margin inconspicuous (Peninsular Siam to Pahang and Perak) . . . . **minutiflorum**

Leaves chartaceous or slightly coriaceous; tertiary nerves immersed, almost or quite invisible below; cartilagineous margin rather distinct:

Leaves drying bright chestnut brown; pedicels of ♂ flowers strongly pubescent (S. Indo-China) . . . . . **chevalieri**

Leaves drying leaden or greyish; pedicels of ♂ flowers sparsely pubescent or glabrous:

'Leaves acute; petiole and pedicels of ♂ flowers ± pubescent; styles conical, erect' [Beille] (S. Indo-China) . . . . . **lingulatum**

'Leaves rounded or obtuse; petiole and pedicels of ♂ flowers glabrous; styles dilated at apex, ± reflexed' [Beille] (N. Indo-China) . . . . . **poilanei**

XVII. THE IDENTITY OF THE GENUS HETEROCALYX GAGNEP. (P. & H. 85)

In what was probably one of his last papers, Gagnepain described (amongst others) the supposed new genus *Heterocalyx*, with the sole species *H. laoticus*, from a collection made by Dr. A. F. G. Kerr in Laos in 1932. Gagnepain stated that the plant was not included in the 'Flore générale de l'Indo-Chine', and that it appeared to be related to the genera *Aleurites*, *Dimorphocalyx*, *Deutzianthus* and *Thyrsanthera*.

Duplicates of the type and syntype (*Kerr* 20895 and 20895A) are preserved in the Kew Herbarium, and confirm the suspicion raised by a study of the original description, namely, that this is none other than the well-known *Agrostistachys indica* Dalz. This is the type-species of the genus *Agrostistachys*, and is actually included, with illustrations, in the Flora of Indo-China. It is evident that Gagnepain's powers were failing at this time, since the genus is one of the most distinct and isolated among Asiatic *Euphorbiaceae*, having no close relationship or even superficial resemblance to any of the genera mentioned by him. The synonymy and Indo-Chinese distribution are as follows:

Agrostistachys *Dalz.* in Hook., Kew Journ. Bot. **2**, 41 (1850); Pax & Hoffm. in Engl. & Harms, Pflanzenfam., ed. 2, **19c**, 96 (1931)

Heterocalyx Gagnep. in Not. Syst. **14**, 33 (1950)

Agrostistachys indica *Dalz., l.c.*; Gagnep. in Lecomte, Fl. Gén. Indoch. **5**, 465, fig. 57, 7–11, fig. 58, 1–2 (1926)

Heterocalyx laotica Gagnep. in Not. Syst., *l.c.*

Cochinchina: Phu Quoc I., 1874, *Pierre* 1419.
Annam: Tourane, 1927, *J. & M. S. Clemens* 3613.
Laos: Tawieng, 1932 *Kerr* 20895 20895A.

The species seems to have a rather scattered distribution, being now known from Peninsular India (where it is apparently widespread), Ceylon, Indo-China, North Borneo and the Philippines. The Philippine form has been distinguished as *A. maesoana* Vid., but it seems doubtful if it deserves specific distinction.

XVIII. THE GENUS WETRIA BAILL. RECORDED FROM BURMA (P. & H. 135)

The genus *Wetria* Baill, probably monotypic*, with the sole species *W. macrophylla* (Bl.) J. J. Sm., is represented by comparatively few collections, and is evidently a somewhat rare or local tree. Hitherto it has been known only from the Malay Peninsula (State of Pahang only, including the island of Pulau Tioman), Sumatra (including the island of Sipora), W. Java (several residencies, but 'far from common', *teste* J. J. Smith), Borneo (*teste* Boerlage, *sine loc.*, presumably Indonesian part; Sarawak, Gunong Lundu, *J. W. Anderson* 126), and the Philippines (Luzon, Bancalan, Negros).

* The second supposed species, *W. cuneifolia* (Miq.) Pax, from Sumatra, is, according to Pax in Engl., Pflanzenr. IV. **147**, VII, 220 (1914), altogether doubtful.

In looking through some undetermined Indian material of the genera *Agrostistachys* and *Alchornea* recently, I have found two collections of *Wetria macrophylla* from Lower Burma. As this represents a considerable north-westerly extension of range for the genus—approximately 900–1000 miles northward from Pahang—it seems worth while to place these collections on record.

Wetria macrophylla (*Bl.*) *J. J. Sm.* in Meded. Dept. Landbouw **10** (Koord. & Val., Bijdr. Booms. Java **12**), 471 (1910); Pax in Engl., Pflanzenr. IV. **147**, VII, 219 (1914), *q.v.* for synonymy.

BURMA. Amherst Distr.: bank of Thaungyin R., 14 March 1909, *Lace* 4708: 'Small tree'. Thaungyin Division: 39 miles Mya wa di Road, 13 Dec. 1931, *Maung Ba Pe* 12925: 'Tree 40 ft. high; fruit green'.

The Thaungyin River, in its upper course, forms the boundary between the Amherst District of Burma and the Nakawn Sawan Circle of Siam. The locality is doubtless at or near the point where the road from Moulmein to Tak (Rahaeng), in Siam, crosses the Thaungyin, lat. 16° 45′ N., long. 98° 30′E.

XIX. A NEW GENUS FROM BORNEO

(P. & H. 226a)

In the Journ. Straits Branch R. Asiatic Soc. **1917**, No. 76, 92 (1917), Merrill described the new species *Ostodes villamilii*, based upon a single collection from North Borneo. He remarked that it was 'apparently not closely allied to any previously described form. It is somewhat anomalous in *Ostodes* in its few stamens . . . The orbicular terminal appendages of the calyx lobes are characteristic . . . .'

Further gatherings of this distinctive plant have since come to light, including a recently collected fruiting specimen, and it is clear that the species is referable neither to *Ostodes* nor to any other known genus. In general habit there is a great similarity to *Elateriospermum tapos* Bl., but there are profound differences in details of flower, fruit and inflorescence.

Tapoïdes *Airy Shaw*, gen. nov. (*Euphorbiaceae*—? *Cluytieae*?); foliis dimorphis, floribus dioecis, inflorescentiis thyrsoïdeis axillaribus sed apicem ramorum versus aggregatis, calyce alabastro clauso sub anthesi in segmenta 3 inaequalia apice lobulis membranaceis 1–2 aucta irregulariter fisso, petalis in flore ♂ majusculis liberis 5, disci glandulis conspicuis, staminibus circiter 7 (5 + 2) filamentis brevibus pubescentibus, capsula tricocca dense cinereo-tomentella, inter *Euphorbiaceas* asiaticas bene distincta.

Flores masculi: *Calyx* in alabastro clausus, sub anthesi in segmenta 3 profunde fissus, segmentis majoribus lobulos 2 parvos membranaceos ± orbiculares gerentibus, segmento minore lobulo singulo plerumque aucto, lobulis in alabastro se jam aperiente manifeste imbricatis. *Petala* 5, pro rata majuscula, libera, sub anthesi patentia, alba, distincte parallele venosa (cf. *Dryandra* spp.!), integra vel emarginato-erosula, intus inferne pubescentia. *Discus* conspicuus, annularis, carnosus, in segmenta irregulariter interruptus, *Stamina* circiter 7, in seriebus duabus (5 + 2) disposita, filamentis brevibus

crassiusculis inferne dense pubescentibus, antheris rotundatis lateraliter dehiscentes. *Pistillodium* nullum. *Flores feminei* ignoti, sed calyce (e specimine fructifero) ei floris masculi simili sed majore. *Fructus* ut videtur capsularis, tricoccus, dense cinereo-tomentellus, calyce persistente (? paullo accrescente) suffultus. *Semina matura* non visa.

Arbor usque 30 m. alta, ramulis striatis, cortice pallido. *Folia normalia* apicem ramorum versus aggregata, elliptica, integerrima, 10–25 cm. longa, 4–8 cm. lata, chartacea, glabra, prominenter reticulato-nervosa, longiuscule petiolata, petiolis rectis gracilibus basi et apice anguste pulvinatis. *Folia floralia* (seu *bracteae foliaceae*) similia, sed longe minora, 2–6 cm. longa, inflorescentias superiores vel inflorescentiarum ramos suffulcientia; stipulae parvae, subulatae. *Inflorescentiae* ♂ apicem ramorum versus aggregatae, irregulariter thyrsoïdeae, ramis alternis valde angulatis rigidiusculis laxe multifloris; bracteae verae parvae, subulatae. *Inflorescentiae* ♀ ut videtur paucae et tantum 1–3-florae, statu fructifero axi tereti 2·5–6·5 cm. longo, pedunculis teretibus striatulis 1–1·8 cm. longis, calycis segmentis persistentibus patentibus vel reflexis 3–5 mm. longis irregulariter bifidis et lobulatis. *Capsula* (? immatura) 1·5 cm. diametro, apice retusa, coccis dorso obtuse carinatis, stylis deciduis (non visis).

Tapoïdes villamilii (*Merr.*) *Airy Shaw*, comb. nov.

Ostodes villamilii Merr. in Journ. Str. Br. R. As. Soc., **1917**, No. 76, 92 (1917), et **1921**, Spec. No., 345 (1921).

Sarawak. Baram, March 1895, *Hose* 42.

North Borneo. Sandakan, in forests, alt. 90 m., 27 Feb. 1916, *Villamil* 164 (type!), Elopura, Kabili-Sepilok Forest Reserve, alt. 60 m., middle of big hill, 25 March 1939. *Enggoh* (*N. Born. For. Dept.*) 10186: 'Tree 25′ high, 19″ girth. Flower white.' Vernacular name (Dusun Kinabatangan): *belit tangau*. Sandakan, Sepilok Forest Reserve (15 miles W. of Sandakan), Compartment 17, alt. 9 m., 7 May 1955 (fr.), *G. H. S. Wood* SAN 16532: 'Tree, 95 ft. high.'

This plant presents an unusual combination of characters. In general appearance the herbarium specimens bear a considerable resemblance to *Elateriospermum*, in their glabrous, entire, strongly reticulate leaves, and subterminal clusters of small-flowered inflorescences, and it is possible that this may in fact be its closest affinity. *Elateriospermum* differs, however, in the biglandular apex of the petiole, in the bisexual inflorescences (the central flower ♀), with opposite or subopposite branching, in the entirely 'normal' calyx, with free sepals, in the absence of petals, in the more numerous (10–18) stamens, and in the very different large glabrous fruit.

The curious calyx appears to be without parallel in the family. The only genus that I have been able to trace with any approach to it is *Dryandra* Thunb. (*Aleurites* Sect. *Dryandra* [Thunb.] Muell.–Arg.), where it splits semi-spathaceously, and is also similar in texture to that of *Tapoïdes*; but it lacks the terminal membranous lobules of the latter genus. The texture and conspicuous sub-parallel venation of the petals are also very reminiscent of *Dryandra*. No other genus of Pax & Hoffmann's *Chrozophoreae-Irregulares* shows any affinity with *Tapoïdes*.

The 'dimorphic' leaves, if the term is warranted, constitute another distinctive feature. The main axis of the shoot, above the normal foliage leaves and above the majority of the inflorescences, or inflorescence-

branches, bears a number of 'miniature' leaves subtending the upper inflorescence-branches. Whether this part of the shoot eventually elongates after flowering, and the 'miniature' leaves then attain normal dimensions, or whether this part of the axis, together with these leaves, eventually dies off, it is not at present possible to say. The feature, however, strongly recalls the curious 'bract-leaves' of *Omphalea*, though of course the twining habit of this genus is widely different from that of the present plant. It may be noted that both *Omphalea* and *Elateriospermum* are included by Pax & Hoffmann in their tribe *Gelonieae*, although it is practically certain that these genera have no relationship whatever with *Gelonium*. A tendency to the production of reduced leaves is also seen in *Codiaeum*, which is certainly related to *Omphalea*, though placed by Pax & Hoffmann in another tribe (*Cluytieae*) on account of the presence of rudimentary petals.

Any close affinity with other genera of the petaliferous tribe *Cluytieae*, such as *Trigonostemon*, *Ostodes*, *Dimorphocalyx*, etc., seems improbable, but this group is in urgent need of revision.

The generic name *Tapoïdes* has been given to indicate the striking resemblance to *Elateriospermum tapos* Bl., *tapos* being the native Sundanese name of the latter tree.

Garden shrubs and trees.*—This is the fourth book in the Kew Series to appear. The aim of this series, which has R. D. Meikle as its general editor, is to provide comprehensive and practical guides for the student and the plant lover.

This particular work is the result of an interesting and successful attempt on the part of the author to meet the demands of two classes whose requirements often differ widely. Success is due largely to the author's recognition of the common interests of these two groups—their love for plants, their appreciation of good illustrations which display their beauty and form accurately and with a natural effect, and their thirst for interesting details connected with their history, their habits of growth and flowering.

This work will do much to foster and increase this love and interest in plants generally and of course, in particular, shrubs and trees. The identification keys, the line-drawings and colour plates, and the mass of descriptive and historical details of the species mentioned, gives the book an attractive yet scientific outlook producing a combined effect which is very rare in books of this size. Many a copy will be treasured for its value, for the deeper seated interest which has grown from its use, and for the avenues which it has opened up and indicated clearly as lines for further study.

G. E. Brown

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* *Garden Shrubs and Tress.* By S. G. Harrison, with key to genera by R. D. Meikle, colour illustrations by A. V. Webster and text illustrations by E. V. Petts, No. 4 of the Kew Series. Pp. 318, 16 plates and 73 figures. London: Eyre & Spottiswoode, 1960. Price 25/-.

Contributions to the Flora of Tropical America: LXVI *

N. Y. Sandwith

ON TWO BRITISH GUIANA SPECIES OF NAVIA

The interesting genus *Navia* (*Bromeliaceae*) is confined to the Guayana Highland area and was recently provided with a key by Dr. Lyman B. Smith, who has described a very large number of new species (see Mem. New York Bot. Gard. **9**, No. 3, 295–298, ann. 1957; **10**, No. 2 19–22, ann. 1960).

The collection made last year in the Potaro Valley by the Oxford Expedition to British Guiana, 1959, included an unusual little plant which was found to be closely related to *Tofieldia rupestris* Gleason, a species based on two British Guiana gatherings made by Mr. R. A. Altson on rocks and boulders at 75 m. at the Macreba Falls, Kurupung River, Pakaraima Mountains, in August–September 1925. Gleason's species was obviously not a *Tofieldia*, if only on account of the minutely lepidote, polystichous foliage. Further study has shown that it is a *Navia*, in *Bromeliaceae*, and conspecific with Dr. Smith's very distinct, racemose *N. fluviatilis*, the type of which was collected in the same neighbourhood on the Membaru-Kurupung Trail, on exposed sandstone boulders in stream-bed at 1000 m., in Oct.–Nov. 1951. The following new combination is required:—

Navia rupestris (*Gleason*) *Sandwith*, comb. nov.

Tofieldia rupestris Gleason in Bull. Torrey Bot. Club **56**, 18 (1929)
Navia fluviatilis L. B. Smith in Mem. New York Bot. Gard. **9**, 298, fig. 27 (1957)

The diagnosis and description of the new species collected by the Oxford Expedition are as follows:—

Navia cataractarum *Sandwith*, sp. nov.; *N. rupestri* (Gleason) Sandwith affinis, habitu nano, indumento scapi inflorescentiaeque papilloso-piloso, sepalis petalisque acute acuminatis, petalis quam sepalis brevioribus statim distinguitur.

Herba humilis acaulis, ut videtur perennis, 3–5 cm. alta, rosulam foliorum e summo caudice brevissimo vaginis solutis foliorum emortuorum obtecto emittens. *Folia* 15–20, ascendentia vel exteriora stellatim patentia, graminiformia, in apicem acutissimum pungentem attenuata, basi in vaginam dilatata, ad 3 cm. longa, ad 3 mm. lata, subcoriacea marginibus saepius revolutis, inermia, supra glaucescentia, glabra nisi lepidibus nitentibus minutissimis sub lente forti visibilibus copiose conspersa. *Scapi* 1–2, cum inflorescentiis folia subaequantes vel breviores, velut pedicelli bracteae atque sepala pilis multicellularibus furfuraceo-papilliformibus inaequalibus patentibus flexuosis flavido-brunneis crebre induti; scapus ipse brevissimus, inflorescentiam subaequans, bracteis lanceolatis circiter 3·5 mm. longis.

* Continued from Kew Bull. **13**, 443 (1959)

Inflorescentia simplex, racemosa, axi 1 cm. tantum longo vel breviore; bracteae lanceolatae vel ovato-lanceolatae, acutae, basi dilatatae nonnunquam fere subamplexicaules et ad 2 mm. latae, circiter 3 mm. longae, albo-marginatae, concavae; pedicelli ascendentes, 4–7 mm. longi. *Sepala* libera, lanceolata, apice viridia conspicue incrassata cucullato-acuminata apiculo flexuoso, 3·5 mm. longa, ad 1·2 mm. lata, inferne plicato-navicularia tenuia ac albo-marginata, extra pilis supra commemoratis basi incrassata tuberculata insidentibus induta. *Petala* alba, sepalis breviora, 3 mm. vix excedentia, vix 1 mm. lata, anguste elliptico-lanceolata, apice acute acuminata ac apice ipso flexuoso recurvato. *Stamina* inclusa, basi tepalorum inserta, filamentis 1·5 mm. antheris 0·8 mm. longis. *Ovarium* superum, stylo incluso anguste conico-lanceolatum, 3·2 mm. longum, sensim in stylum atque stigmata attenuatum; ovula elliptico-oblonga, nuda, exalata. *Capsula* anguste ellipsoidea, 5–6 mm. longa; semina haud visa.

British Guiana, Potaro River, by Amatuk Falls, c. 60 m., 31 July, 1959, *B. A. Whitton* 51 (type in Kew Herb.). 'Forming a dense sheet on a small, broken rock. Only one specimen noted in flower. Upper surface of leaves slightly glaucous. Stem, pedicels and calyx softly hairy. Pedicels and lower part of calyx white, the upper part green.'

A very distinct species, easily separable from *N. rupestris*, which alone it resembles, by its dwarf habit with short leaves, scapes and inflorescences, by the curious indumentum of the latter, and by the conspicuously acuminate sepals and petals.

The families of flowering plants.*—The publication of the first edition of 'The Families of Flowering Plants' by Dr. J. Hutchinson was a major event in the history of taxonomic botany in Britain. The first volume, dealing with the Dicotyledons, appeared in 1926 and the second volume, containing the Monocotyledons, in 1934. British botanists were presented with a new and original scheme of classification based on theories of probable phylogeny and taking into account the important researches of Bessey. As Lawrence ('Taxonomy of Vascular Plants': 136 (1951)) has truly written, Hutchinson's classification 'has been a greater stimulant to phyletic thinking through the past decade or two than any other similar contribution'.

The appearance of a second edition of this important work, embodying the results of the author's studies during the twenty-five years which have elapsed since the publication of the second volume of the first edition will be greeted with interest by all workers on taxonomic botany. To do full justice to this work would require many months of study and probably an extensive essay. Here little will be attempted beyond pointing out some of the principal differences from the first edition and commenting on some of the more important innovations.

The second volume of this new edition, containing the Monocotyledons, needs little notice here, since, as the author states in the preface, 'Except for the addition of one new family, *Cartonemataceae* Pichon, and a number of

* *Families of Flowering Plants*. By J. Hutchinson, 2nd edition. Vol. I, Dicotyledons. Pp. xvi + 510, 342 figures. Vol. II, Monocotyledons. Pp. x + 282, 108 figures. Oxford: The Clarendon Press, 1959. Price (2 volumes) 7 guineas.

genera described since the original publication, little alteration has been made to this second volume dealing with Monocotyledons.'

The first volume, on the contrary, is almost a new work. Some idea of the changes involved will be given by the fact that in the first edition there were 328 pages whilst in the second there are 508; the number of orders has increased from 76 to 82 and the number of families from 264 to no less than 342. Among these no less than 8 are published here for the first time, the authorship of two of them being attributed to Mr. J. E. Dandy, the Keeper of Botany at the British Museum, Natural History. Every family is illustrated in the text, mostly by the author's own talented pen.

The changes and additions that have been made among the families are full of interest to the working taxonomist. For instance, he will, I believe, note with approval the splitting up of *Loganiaceae*—previously a very mixed group—into a number of smaller and more uniform families, and will certainly be thankful that the genus *Gaertnera* has finally been transferred to the neighbourhood of its obvious allies in the *Rubiaceae*. His interest will be stimulated by such matters as the separation of *Helleboraceae* and *Paeoniaceae* from the *Ranunculaceae*; by the separation of *Cuscutaceae* from *Convolvulaceae*; *Periplocaceae* from *Asclepiadaceae*; and *Ehretiaceae* from *Boraginaceae* (but not *Chrysobalanaceae* from *Rosaceae*). These few examples chosen from among so many will perhaps be sufficient to whet the reader's interest and to indicate the originality of the author's thought.

The delimitation of families is so much a matter of opinion that every botanist will no doubt have his own views. The reviewer cannot help regretting that Dr. Hutchinson should have seen fit to reject the family *Dioncophyllaceae*, surely an outstandingly remarkable group, and also the *Montiniaceae*, two families the validity of whose recognition on morphological grounds is backed by impressive anatomical and palynological evidence.

No doubt the most controversial change in this new edition is in the main division of the Dicotyledons. In the first edition they were divided primarily on the freedom or connation of the petals into the divisions *Archichlamydeae* and *Metachlamydeae*. In the second edition this scheme has been abandoned in favour of a primary division into *Lignosae* and *Herbaceae*, 'the former embracing families which are primitively and predominantly woody, the latter those that are primitively and predominantly herbaceous'. This is not the place to undertake a full examination of the merits and demerits of this system; it will certainly provoke discussion, and I hope, a renewal of 'phyletic thinking'. There can be no doubt, as every working taxonomist will agree, that there are groups of clearly related families which share a common tendency to herbaceousness or else woodiness. Nevertheless, the reviewer cannot help recalling the apparent ease with which the transition from one habit to the other appears to have been accomplished in various families, at least in the African tropics, and also, to take one example, the great diversity of habit within so natural a group as the *Papilionaceae* where large genera or even tribes may be predominantly woody or predominantly herbaceous. Dr. Hutchinson's extension of this criterion to all the Dicotyledons results in many related families being put together. It also results, in the reviewer's opinion, in a number of natural relationships becoming obscured; notably, for instance, in the wide separation of *Capparidaceae* and *Cruciferae*, and of

Bignoniaceae and *Pedaliaceae* from *Scrophulariaceae* and *Acanthaceae*. Nevertheless, on almost every page the reader will find matter to rouse his interest and set him thinking.

It is to be wished that the author had somewhere made it clear whether there is any criterion, except relationship with other families, which must be to some extent hypothetical, whereby those predominantly herbaceous families in the 'fundamentally woody' *Lignosae* can be separated from the intrinsically herbaceous *Herbaceae*.

The introductory matter in the second edition is much the same as that of the first—that invaluable key to the families appears again, and also the most useful lists of families showing certain more or less constant morphological characters. These lists need revising and bringing up to date, for the reviewer has found it quite easy to find additions to them, especially from those families recognised in the second but not the first edition. The reviewer also regrets the disappearance in the new edition of the elegant and appropriate floral tribute to Bentham and Hooker which appeared after the title page in the old edition. No doubt revised phylogenetic ideas in the new edition might have made it inconsistent, but it would be an inconsistency easy to forgive.

Dr. Hutchinson's work may be justly looked upon as a crowning achievement of a life-time's devotion to the study of plants and their classification; it represents the fruit of an extraordinarily wide and perhaps unrivalled experience of the flowering plant kingdom and is the more valuable for that reason. It remains to wish the distinguished author many years of further energy during which he may add to our indebtedness to him.

J. P. M. Brenan

British ferns and mosses.*—For a long time there has been a great need for an accurate, up-to-date work on British ferns and related vascular cryptogams. This has now been met by the publication of the fifth volume in the Kew Series. The book is especially written for beginners and all technical terms used are explained in detail, even to the extent of providing instructions on the use of a hand lens. The last forty pages are devoted to the more common British mosses, especially those of the lowlands and the selection made is extremely well chosen. The fifteen coloured and fifty-two black and white illustrations, depicting all the British vascular cryptogams and those mosses described in the text, are up to the usual high standard of Miss Ann V. Webster. As these illustrations are not all drawn to the same scale this should have been indicated in the text. One minor slip by the author, which is pointed out merely for those who are not pteridologists, is that the wrong authority is given for *Dryopteris filix-mas*. This should have read *Dryopteris filix-mas* (L.) Schott.

J. L. Gilbert

* *British Ferns and Mosses*. By Peter Taylor, with colour and black and white illustrations by A. V. Webster, No. 5 of the Kew Series. Pp. 231, 15 plates, 52 figures. London: Eyre & Spottiswoode, 1960. Price 25/-.

Wood-structure of European trees and shrubs.*—In 1945, Pal Gregüss, Professor of Botany in the University of Szeged (Hungary), published a reference book entitled 'Bestimmung der mitteleuropäischen Laubhölzer und Sträucher auf xylotomischer Grundlage'. The work now under review is an extended version of the volume that appeared in 1945. The new edition contains detailed descriptions of the wood-structure of rather more than 300 species of broad-leaved trees and shrubs, belonging to 153 genera and 60 families, that are either native of Europe or which have become acclimatized to European conditions. The author has arranged the families in the same sequence as in the Englerian system. The descriptions, which take up some 235 pages of the text, have the supreme merit of being accurate, and they are easy to understand because they are written in very simple German. It is to be regretted, however, that we are not told the sources from which the wood specimens were obtained, nor on how many each of the descriptions is based. Furthermore there are no reference numbers to the specimens in question. The verbal descriptions are supplemented by 303 plates showing the wood-structure in photomicrographs of transverse and longitudinal sections, whilst further histological details are illustrated by line drawings of cells from macerated material. Besides the descriptions of the individual species, the book includes 26 pages on the principles and technique of timber identification. There is a key, 20 pages long, to the identification of the wood of the trees and shrubs covered by the book, and this is given in full in English as well as German. The book is fully indexed and contains a rather brief, selected bibliography. Finally the diagnostic characters for the woods are recorded in a series of tables enclosed in a folder at the end of the book.

Although the book is purely descriptive, and no synthesis of ideas relating wood structure to taxonomy has been attempted, of its practical value as an aid to the identification of European timbers there can be no doubt. Indeed, in recent years, it has frequently been necessary to turn to the 1945 edition of Professor Gregüss's book whenever woods and woody specimens of European origin have been received for identification at the Jodrell laboratory. The new and enlarged edition will be still more useful.

The appearance of this fine, luxuriously produced book is a tribute not only to the energy of the author and his collaborators, but also to the enterprise of the publishers who have printed and produced it so well. This achievement is all the more remarkable when it is remembered that we are also indebted to Professor Gregüss for a large reference book on the identification of the wood of living gymnosperms, of which German and English editions appeared in 1955.

C. R. METCALFE

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* *Holzanatomie der europäischen Laubhölzer und Sträucher.* By P. Gregüss. Second Edition. Pp. 330, 303 plates. Budapest: Der ungarischen Akademie der Wissenschaften, 1959. Price $20.50

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—— *magalismontana* Aubrév. & Pellegr. 305, 308.

Nomenclatural note on Labisia Lindl. (Myrsinaceae).—In an interesting note, van Steenis (Fl. Mal. Bull. **1**, No. 4, 109: 1948) has shown that Reinwardt's neglected genus *Angiopetalum* (1825) is none other than Lindley's well-known *Labisia* (1845). He has proposed, however, that the latter name be conserved, and this has been done. The identification of *Angiopetalum*, however, entails some changes in *Labisia* at the specific and infra-specific levels, for van Steenis has also shown (*l.c.* 97–99) that Reinwardt's paper (in Syll. Pl. Nov. Ratisb. **2**, 1–15), in which *Angiopetalum punctatum* appeared, was almost certainly published late in 1825; whereas Part 13 of Blume's Bijdrage, containing the description of *Ardisia pumila* Bl. (= *Labisia pumila* (Bl.) F.-Vill.), probably did not appear until February 1826. Blume's epithet must evidently, therefore, be superseded by Reinwardt's.

Mez, in his monograph of the *Myrsinaceae* (Engl., Pflanzenr. IV. **236**, 171–2: 1902), retains the three forms originally recognised by Scheffer (Comm. Myrsin. Archip. Ind. 93: 1867) for this polymorphic species: α *genuina* Mez, β *lanceolata* (Scheff.) Mez, and γ *alata* (Scheff.) Mez. Now Scheffer cited '*Allopetalum punctatum* Reinw. MS.' (= *Angiopetalum punctatum* Reinw.; see van Steenis, *l.c.*) under his var. *alata*, and Mez cited specimens of Reinwardt under f. *alata* also. With Reinwardt's specific name superseding Blume's, this means that the 'type' form of the species is no longer f. *genuina*, but f. *alata*. The consequent changes will become clear from the following synonymy.

Labisia punctata (*Reinw.*) *Airy Shaw*, comb. nov.
Angiopetalum punctatum Reinw. in Syll. Pl. Nov. Ratisb. **2**, 7 (1825)
Ardisia pumila Bl. Bijdr. (13), 688 (1826)
Labisia pothoina Lindl. in Bot. Reg. **1845** [n. ser. **18**], t. 48 (1845)

forma **punctata**
Angiopetalum punctatum Reinw., *l.c.*
Allopetalum punctatum Reinw. ex Scheff. Comm. Myrsin. Archip. Ind. 92 (1867), *pro syn.*
Ardisia pumila γ *alata* Scheff., *l.c.*
Labisia alata (Scheff.) N. E. Br. in Illustr. Hortic. **32**, 186, t. 580 (1886)
Labisia pumila γ *alata* (Scheff.) Mez in Engl., Pflanzenr. IV. **236** (*Myrsinac.*), 172 (1902)

forma **lanceolata** (*Scheff.*) *Airy Shaw*, comb. nov.
Ardisia pumila β *lanceolata* Scheff., *l.c.*
Labisia pumila β *lanceolata* (Scheff.) Mez, *l.c.*; Airy Shaw in Bull. Misc. Inf., Kew **1939**, 516 (1939)

forma **gladiata** (*Airy Shaw*) *Airy Shaw*, comb. nov.
Labisia pumila f. *gladiata* Airy Shaw, *l.c.* 517

forma **pumila** (*Bl.*) *Airy Shaw*, comb. nov.
Ardisia pumila Bl., *l.c.*
Labisia pumila (Bl. F.-Vill. in Naves & F.-Vill., Noviss. App. Fl. Philipp. Blanco, 123 (1880); Mez, *l.c.*
Labisia pumila α *genuina* Mez, *l.c.*

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